Telephony

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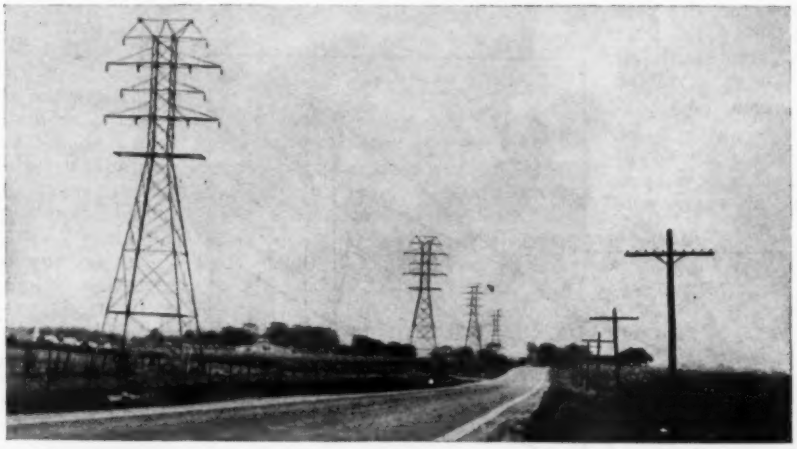
**PROPERLY-CONSTRUCTED and spaced transpositions are necessary in rural telephone circuits to reduce crosstalk and minimize inductive interference in order to render high grade of service. Suggestions and illustrations showing how to cut-in transpositions**

# TRANSPOSITIONS IN RURAL LINES

By RAY BLAIN

THE PROPER transposition of metallic rural lines is often neglected despite the fact that practically all telephone men realize its great importance. Properly constructed and spaced transpositions are necessary in all telephone circuits for the purpose of reducing crosstalk, due to the proximity of other telephone circuits, and to minimize inductive interference, or "noise," from nearby electrical circuits, if a commercial grade of transmission is to be obtained.



A Common Present-Day Situation: A Rural Telephone Lead on One Side of a Road and a High-Tension Power Transmission Line on the Other.

The disturbing effect of one rural telephone line circuit on parallel circuits, and the degree to which other parallel telephone circuits may disturb a rural line circuit, must always be considered. Either the balanced or unbalanced EMF of an electrical circuit often, through the creation of noise, disturbs a telephone circuit. This type of disturbance is known as electrostatic inductive interference.

Crosstalk between telephone circuits, as well as interference caused by power circuits, is frequently due to this cause. When the disturbance is crosstalk, the disturbing EMF is small, but nearness of the two circuits is likely to make the disturbance serious. The balanced current of an electrical circuit often disturbs a telephone circuit. This type of disturbance is referred to as electromagnetic inductive interference.

Crosstalk on rural telephone lines may be due to either electrostatic or electromagnetic interference. It may be reduced or eliminated by proper transposition of the affected circuits. While it is true that excessive crosstalk is detrimental to telephone service, it is likewise true that low volume crosstalk, which is usually present on all rural lines, has practically no effect on transmission. The total elimination of crosstalk would, in many instances, cost an excessive amount. As such elimination is not necessary, most managers are content to reduce it to a level at which it is hardly noticed and not bothersome.

The importance of rural line transpositions has increased considerably in recent years as a means of reducing electrostatic inductive interference caused by numerous high-potential, alternating-current transmission lines, and rural electrification. When alternating current at high voltage is transmitted over a conductor, an electrostatic field is created in the surrounding space.

When the two conductors of a rural telephone line extend through this field, alternating current and potentials will flow from one of the conductors to the other of the telephone circuit, creating noise. The transposition of the conductors

tends to equalize the induced currents in them and minimize the flow from one to the other through the subscriber's set which causes the disturbance always harmful to good transmission.

Elaborate and varied transposition schemes have been devised for present-day commercial toll lines. These systems cover a certain number of transpositions forming a transposition section which is always balanced within itself. The complete toll line is made up of a succession of these sections. Transposition sections may be standard or special in regard to length.

A standard section is about eight miles in length with transposition poles spaced about 1,300 feet apart. A special section may be anything from one span to about 52,000 feet, with transposition poles spaced in accordance to the length of the section. The transposition section should always end at the terminal of the line, and usually at offices and junction poles where important circuits leave the main lead.

A special transposition scheme is also frequently used where a portion of a telephone line is exposed unduly to some kind of interference such as a high-voltage transmission line. In the old days transpositions were generally placed on the pole nearest to the measured location, but at present on all important toll leads an extra pole is often set so that the transposition may be placed at the exact location.

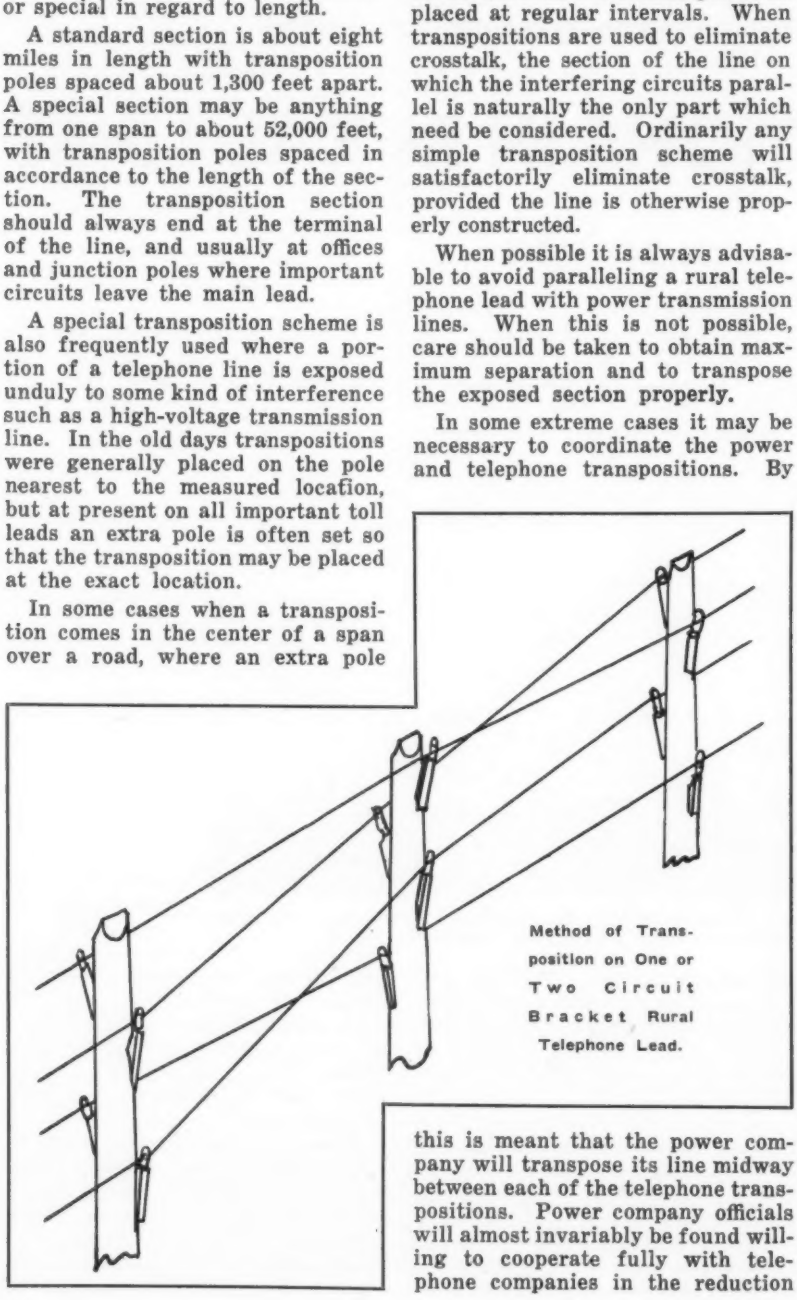
In some cases when a transposition comes in the center of a span over a road, where an extra pole cannot be set, the transposition is supported by a special bracket, held in place by other wires of the lead.

On the average rural telephone line such attention to detail, with its accompanying cost, is not generally considered necessary. I have known of cases when a noisy rural line circuit was corrected by cutting in a single transposition at its exact center. Generally, transpositions placed each half-mile will be about right in the average rural telephone line.

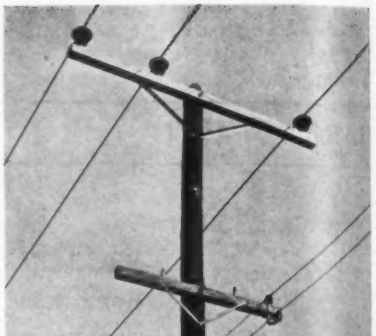
As a rule though the poles should be counted and the transpositions placed at regular intervals. When transpositions are used to eliminate crosstalk, the section of the line on which the interfering circuits parallel is naturally the only part which need be considered. Ordinarily any simple transposition scheme will satisfactorily eliminate crosstalk, provided the line is otherwise properly constructed.

When possible it is always advisable to avoid paralleling a rural telephone lead with power transmission lines. When this is not possible, care should be taken to obtain maximum separation and to transpose the exposed section properly.

In some extreme cases it may be necessary to coordinate the power and telephone transpositions. By this is meant that the power company will transpose its line midway between each of the telephone transpositions. Power company officials will almost invariably be found willing to cooperate fully with telephone companies in the reduction of interference to telephone circuits, provided they are approached in a proper manner.



Method of Transposition on One or Two Circuit Bracket Rural Telephone Lead.



Bracket Type Transposition in Telephone Circuit on Joint Pole With Power Line.

Grounded telephone lines naturally cannot be transposed, although they are more susceptible to interference than are metallic circuits, when placed within the field of a power line. Frequently when a grounded circuit is exposed to a power transmission line for only a part of its total length, it may be advisable to string a second wire and make the exposed section metallic. The metallic section should be transposed and connected to the grounded section by properly-designed repeating coils. These coils should always be protected against lightning.

The arc suppressor type of surge protector is believed an ideal type of lightning protection for repeating coils installed on the line in this manner. This protector is of the gaseous discharge type and will protect the equipment for long periods of time with practically no attention. This protector may also be useful in the discharging of static electricity induced on the line, without harmful effects to the transmission.

When a rural line is exposed to a power transmission line, care should always be taken to insulate the telephone conductors properly. A good grade of insulators should always be used, of a type which will prove effective in wet weather. A good tree clearance should be maintained at all times.

When possible, transpositions should always be placed in circuits by transferring the reels when the

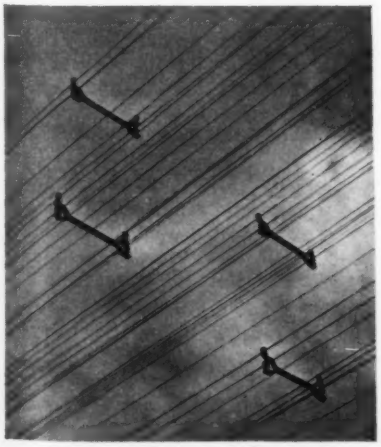
wire is being strung, as then no extra splices in the wire will be necessary. When this cannot be accomplished and the transpositions must be cut-in on working circuits, care should always be observed to make good splices with as few extra ones as possible.

Before starting to cut in a transposition, the line wire should be untied for several spans in either direction and the slack pulled up. In this manner enough slack can usually be obtained to permit the transposition to be made by cutting in only two splices. When sufficient slack is not available, the wires should be cut so that one will reach and a short piece cut in on only one wire. This makes a total of only three splices necessary to complete the transposition.

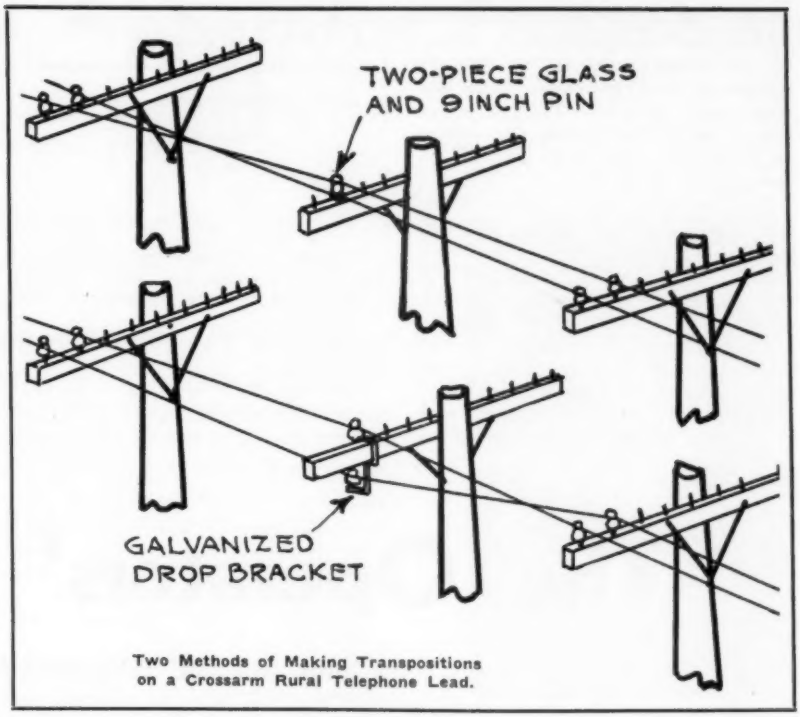
Good splices are absolutely necessary as high resistance in one may cause more noise and crosstalk on a circuit than an inductive disturbance. If sleeve connectors are used, they should always be well twisted, using two pairs of splicing clamps. One telephone company, on a check-up of a certain line, discovered that all defective sleeve connections had been made with only one pair of splicing clamps and a pair of pliers.

If twisted splices are to be used in iron wire, we prefer the three-wire type of splice, twisted with two pairs of splicing clamps. The line wire should always be well cleaned before inserting in splicing sleeves.

In the old days linemen had numerous heated arguments as to whether transpositions should be cut with the left wire over the right or the right over the left. In reality it is not important, for if the position of the wires is changed it does not matter how they cross.



Special Transposition Fixtures Located in Center of a Toll Span.




Two Methods of Making Transpositions on a Crossarm Rural Telephone Lead.

Suppose that we call the first pin on the left end of a crossarm, No. 1 and the next one to it, No. 2. Then when the transposition is cut into the circuit, the wire which is on pin No. 1 will cross to No. 2. The wire which was on pin No. 2 will likewise become pin No. 1.

For the sake of uniformity the left wire usually crosses over the right. Both wires of a circuit should be pulled to equal tension when cutting a transposition so that maximum clearance may be obtained and the wires will not swing together in a high wind.

If the circuit being transposed is on a crossarm, it may be supported in one of three ways. The regular pin may be removed and a 9-inch pin installed, which will hold a two-piece transposition insulator. The difficulty with this type support is that proper clearance is almost impossible and frequent trouble is not uncommon.

The single-point bracket is, perhaps, the best means of supporting a transposition on a crossarm for a rural circuit. With it, proper clearance is always obtained, for the top wire ties on the regular insulator and the lower wire to an insulator supported on the steel pin of the bracket under the crossarm. It is almost impossible for the two wires of a circuit to swing together when supported on this type bracket.

The latest development in transposition brackets is the so-called "Point" type. This was originally designed for carrier circuits only but proved so desirable that it is now used on many commercial toll leads. This bracket has four separate pins, spaced about eight inches apart, in a square, and the wire changes position within this space. The main advantage derived from this type bracket is that the normal spacing of the wires is maintained and the possibility of trouble is quite remote.

The transposition of circuits strung on wood brackets is always comparatively simple. When the brackets are on opposite sides of the pole, the brackets for the transposition are placed on the same side of the pole where the wires cross in the transposition, and they may be placed rather close. When both brackets of the circuit are on the same side of the pole, the wires are separated by the pole in the transposition.

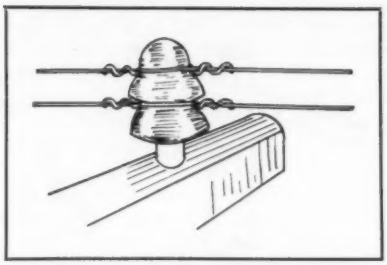
Another practice is to just cross the wires between spans and reverse the positions of the brackets on the transposition pole as shown in the illustration on the opposite page.

The proper spacing of wood brackets will always provide ample clearance in a transposition.

Slack blocks, consisting of wire grips with pulleys, will be found ideal for cutting transpositions in existing circuits. Sash cord can be

used to advantage in these blocks. Two sets of blocks should be placed on the wires of the circuit crossed, pulled-up and snubbed, then the wires cut straight. Jumper wires should be placed across the blocks on important circuits to prevent interruption of service.

Good quality connectors or splicing clamps are always necessary as inferior ones may "burn" the wire, causing it to break later. When cutting in transpositions in copper wire using sleeves, the splicing clamps are used to make the splices inside the blocks. On iron wire the splices are usually made outside the blocks, as it is more convenient and a superior grade of work may be accomplished when working on a tight wire.



Two-Piece Transposition Glass Insulator and Method of Tying Telephone Wires.

Transpositions are so important in the furnishing of good rural line service that their proper use should never be neglected. Any company which has such lines to maintain and is not pleased with the present grade of service, will do well to make a thorough check of the transposition scheme.

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## Telephones in Columbus, Ohio, Increasing Steadily

The Ohio Bell Telephone Co. now has more than 76,000 telephones in use in Columbus. This is almost 10,000 more than there were a decade ago, and the total is fast approaching the peak of December 1929 when the company had 81,000 stations in service. The low point was reached in July, 1933, with 63,428.

# The Operators' Corner

By MRS. MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

"THANK YOU." Two simple little words but they can convey a world of meaning if they are spoken properly; but how frequently their value is lost by poor diction, lack of proper inflection or personal interest tone.

There are many ways of saying "Thank you" but only one correct way; that is, to place the accent upon "you" and, by the tone of voice, putting across the impression of pleasure at being of service. Also, by giving the proper sound to every syllable. How grating and discouraging to hear an operator say, "Thanku" or "Thank ya," particularly in an office where operators have been instructed in *voice technique*.

Then there is the mechanical tone of voice, droning away hour after hour in a meaningless monotone; saying words over and over again, which are of little if any value as far as the customer is concerned, just as static on a radio. On the other hand, what a pleasure and inspiration to hear an operator acknowledge her calls in a clear, distinct tone, using the proper inflection and conveying to the customer the impression: "I am so glad you called, Mr. Jones. It is a real pleasure to serve you and I shall fill your order promptly and accurately."

Don't form the opinion that your chief operator is aways "harping" on the subject of voice work. Its value

**THERE IS only one correct way of saying "Thank you": With distinct diction, proper inflection and personal interest tone. Series 278**

cannot be overestimated. It is one of the most important, if not *the* most important tool used by the operator in her work of serving telephone customers.

Because certain prescribed phrases are repeated over and over again, operators must be zealous in their effort to avoid permitting their voice to develop a mechanical tone.

You may not be in a cheerful frame of mind every time you take your position at the switchboard. You will find, however, if you continue to express a pleasing and cheerful attitude by your tone of voice, within a short time you will actually be in a happier state of mind. If you are a "Doubting Thomas," try it some time. You will find that it actually works.

Once an operator has acquired the habit of repeating or saying her phrases in a mechanical or indifferent tone of voice, it takes real effort and perseverance to correct this defect. It takes patience and tact on the instructor's part to avoid any discouragement on the part of the operator.

It is very helpful to always keep in mind not only *what* you are going to say, but *how* you are going to say it. By following this practice in our everyday life, as well as during the hours we spend at the switchboard, we will soon acquire a natural, pleasing tone of voice, correct diction, enunciation and inflection.

### *Questions from Illinois Operators*

1. When is a second ticket made on a collect station-to-station call?
2. How should the ticket be marked where the operator has given the report and no report charge is to be charged?
3. Which is the most proper answer to a call, "Thank you" or "Right?"
4. In passing a single digit number, so often it is passed "Number 9." If it is correct to pass the number as "9", what inflection should be used?
5. What would you do if you had a subscriber that calls in and says, "Chicago AY," instead of telling you the number, as, "Franklin 5460?"

*The answers to these traffic questions are given on page* 41.

# Station and Apparatus Protection

By R. V. ACHATZ

General Manager, Southern Indiana Telephone Co., Aurora, Ind.

**THE PROBLEM of rural electrification has made it necessary for small telephone companies to install protection for their substation and apparatus equipment. This address, offering suggestions for locating protection equipment, was presented before recent convention of the Minnesota Telephone Association**

RURAL ELECTRIFICATION has brought some new problems to telephone companies in station and apparatus protection—especially problems that are new to the companies operating in rural territory — although there have been no changes in the principles of protection. For discussion, the matter of protection may be divided into three sections: (1) What we have to protect; (2) why we use protection; (3) how are we to protect the lines.

Answering the first question, we protect against momentary or transient discharges. We also have to protect against continuous currents which remain on the lines until the cause is removed. An example of the momentary or transient disturbance is lightning, while the other form against which we must have protection may be due to crosses of electrical power circuits with telephone lines.

We, therefore, require two kinds of protection: one which will conduct excess charges of electricity from telephone lines to the ground, and the other to open the telephone circuit when an excessive current flows.

Protection is used by the telephone companies to protect property and life—our own property, principally, and sometimes that of others. Not many lives are endangered in telephone operation but the possible loss of life must be considered in connection with protection. We must consider the safety of operators and the safety of subscribers who may be using the telephone when a disturbance occurs.

In protecting property there is no use installing protection when its cost is much higher than the cost of the damage which might be done. In protecting life, no reasonable limit can be set. We can not protect absolutely against lightning but we should do the very best we can in protecting operators, subscribers and linemen.

### *How Are We Going to Protect?*

In protecting against transient discharges, the usual practice is to drain the charge from the line through an air gap to ground in order to equalize the voltages. When the current or disturbance is continuous—that is, stays on a line until the cross between electric and telephone wires can be handled physically—fuses can be provided in the telephone line which will melt and open the circuit.

Years ago the impression was formed among many persons that the fuse protected from lightning. As a matter of fact, a discharge due to lightning must pass through a fuse to blow it and so may cause damage beyond the fuse before the fuse is opened. In a similar way, a continuous voltage, such as may be applied in the case of a power line cross, may not discharge across an air gap protector. So a current may flow through the telephone circuit, causing damage, unless a fuse is used to open the circuit. For this reason a modern protector employs both air-gap and fuse protection; one to discharge excessive voltages, and one to open the circuit in case of excessive current.

In some territories there are no power lines and, hence, many exchanges have to get along without fuse protection. With the extension of rural power lines we must use fuse protection at telephones, in addition to the lightning protection which we have.

Another factor in "how to protect" is the ground connection. Protectors have been found installed at subscriber stations without ground connection on the protector. How the protector was expected to operate in such cases is a mystery to anyone familiar with protection installation. The lightning arrester should have a good ground, for without it the high voltage lightning charge will continue on into the house, sometimes wrecking the telephone and doing other property damage, with possible danger to life.

In common battery central offices the standard form of protection is the heat coil. This is absolutely necessary where there is a possibility of direct current exposure. It is not so necessary in magneto exchanges. As lightning protection is installed with fuses at the junction of open wire with cable, no heavy current protection is used at the exchange end of the cable. The heat coils take care of small currents ordinarily known as "sneak currents."

The location of protection of the subscriber's equipment is a matter of opinion. In my own case, the protection is located on the subscriber's premises. This protection at the substation is based on the protection of life and a certain amount of liability in case of damage, if we had failed to take proper steps for the subscriber's protection.

Protection may be located at the junction of the cable and the open

wire. If trouble occurs on the open-wire line between the subscribers and the protection, the company may find itself in a bad situation. Install the protection near the end of the drop wire so there is a minimum length of drop wire exposed. The protective equipment may be outside or inside the subscriber's house. Good protectors may be obtained for either location.

This brings up the question of duplicate protection—at the subscriber's premises and at the cable terminal. It is a case of figuring the cost of repairs. Generally, in my own situation, protected cable terminals are used where open wire extends beyond the cable, and unprotected terminals where the only circuits connected to terminals are drop wires to subscribers' premises.

When the rural electric line comes in your territory, you will face new protection problems and will have to work out your own situation. So far as equipment is concerned, there are plenty of satisfactory types on the market. The problem is to select the proper type of approved protector, to install it properly and to see that protector and ground connection are properly maintained.

# IN THE NATION'S CAPITAL

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

**TESTIMONY IN BELL investigation presented by FCC chief staff engineer and cost expert regarding manufacturing and costs in the Bell System. Some conclusions concerning competitive bidding among manufacturers for business of Bell System companies. Complimentary comments made regarding Independent manufacturers, their products and costs**

INDEPENDENT telephone equipment manufacturers should be especially interested in the recent testimony at the FCC telephone investigation by the staff chief engineer, Cyrus G. Hill, and cost expert, L. P. Alford, on the general subject of manufacturing costs in the Bell System. This testimony, in the opinion of this correspondent, is significant, not so much because of the critical recital against Western Electric practices, but because of the conclusions reached.

After all, whether Messrs. Hill and Alford have made out a fair case boils down to the same old issue of the credibility, competence, and adequacy of the evidence that has dogged the investigation since it started. The FCC staff makes certain charges. The Bell is allowed neither to cross-examine nor put counter testimony into the record. So long as that procedure obtains, honest judgment must be suspended.

BUT COMING back to the specific conclusions and recommendations of the Hill-Alford testimony—that is quite another story. The significance lies in the fact that, right or wrong, justified or unjustified, Mr. Hill recommended the adoption of a definite regulatory policy by the commission for the future. In short, he recommended that competitive bidding in telephone equipment for the Bell System should be required.

This does not, of course, mean that Western Electric would have to get out of the picture. It would only mean that other equipment manufacturers could finally get a "look in." All would, presumably, bid on even terms, and the low man would win the job. Furthermore, it was hinted that the drafting of specifications for bidding should be supervised to see that Bell operating companies did not "load" them in such a way that only Western Electric could fulfill the terms.

NATURALLY the Bell System would put up an argument against the adoption of such a policy, and with determination. Bell operating companies already purport to deal with Western Electric on an "arm's length" bargaining basis whereby costs, profits, and details of payment are arranged just as carefully as if the two contracting parties never heard of each other before the deal started.

Furthermore, the Bell would probably claim that, because of the foreknowledge and certainty of the exact volume of equipment required, Western Electric is organized on a more efficient (and, therefore, less expensive) basis to take care of business, than would be possible if it had to take its chances for business in the open market. Admittedly such "captive" supply operation is a decided economic advantage. Whether the Bell makes full use of it, or passes any of it along to the customers, is another matter. Obviously, the FCC special staff has doubts on that score.

IN FACT, Mr. Hill's testimony indicates the possibility that a "captive" manufacturing plant under the domination of a closed monopoly under same circumstances results in higher prices than might obtain in an open competitive market. Take the situation of Western Electric in 1929, for example. We had prosperity then, new station installations were climbing, and the goose hung high.

All, or at least most, of the accepted economic forecasts pointed to so much telephone equipment required for the Bell from 1930 through 1933, and the Western Electric probably prepared to some extent, in the matter of plant organization, to take care of it accordingly.

We know what happened in 1930 to business generally and what started to happen to the telephone business in 1931. Now, if Western Electric had to take its chance in the open market and found itself stuck with excess plant organization, it would have to take it on the chin and write off the difference, just like every other open-market competitor did.

Just what Western Electric actually did under those circumstances

is not for any impartial observer to say from the present state of the record, but Mr. Hill's impression of what happened can be guessed from his statement that "it would be entirely possible for exorbitantly high prices to yield a small profit, due to any one of these factors." In corroboration, Mr. Hill, under questioning from Commissioner Paul Walker, observed that the Western Electric price index actually increased 20 per cent in 1930, as contrasted with Independent manufacturers who made no increase and in some instances even reduced prices.

SPEAKING of Independent telephone manufacturing companies, there seems to be some difference of opinion at the FCC whether such an industry substantially exists. Commissioner Walker has already been quoted in these pages to the general effect that there is no such animal in the country.

Mr. Hill, in one part of his recent testimony, took a somewhat allied line, stating that Western Electric dominates what there is of Independent manufacturing to such an extent that price comparisons between the two mean nothing. Yet, as we have already noted, Mr. Hill testified that the Western Electric price index rose in 1930, while Independent prices stood still or went lower.

To add to this confusion, we have the extensive report introduced in the FCC investigation record by Dr. L. P. Alford, the staff cost expert, which contains a detailed comparison between Western Electric and Independent manufacturing costs. The report contained numerous statistical bouquets for certain Independent concerns on the basis of cost comparison with Western Electric.

Just for a sample, the report compared the respective average annual output in sales value per dollar expended for labor during a six-year period. The Kellogg company was found to have produced 50 per cent more sales value than Western Electric, while Stromberg-Carlson was reported to have exceeded Western Electric by about 125 per cent. Western Electric was found to have less manufacturing employes per supervisor than all Independents, and Western selling prices were found to be generally not lower than all Independents.

Dr. Alford's report went on to compare Western Electric personnel organization with other manufacturing shops engaged in comparable technical operations. The Bell subsidiary was found to hire "approximately three times as many manufacturing department accounting employes per million dollars of production as do 19 representative machine shops and assembly plants or 59 representative manufacturing concerns."

In the Independent field, Dr. Alford found that the Independent manufacturers agreed "fairly closely with other manufacturers in percentage of accounting expense to value of sales." Western Electric expense was said to exceed the other manufacturers by 4 per cent (1934-5), while Independent manufacturers' expense ranged from .75 per cent for Kellogg to 1.7 per cent for Automatic Electric Co.

ONE COULD go on like this at some length, but comparisons are odious unless it becomes an official duty. Suffice it to say that Dr. Alford's reports, in addition to covering Western Electric manufacturing cost (incidentally condemning the alleged inadequacy of the accounting system for the same) covered to some extent the activities of such Independent manufacturers as North Electric, Leich Electric, Automatic Electric, Kellogg, Gray Telephone Pay Station Co., and Stromberg-Carlson.

One little bouquet, however, tossed by Dr. Alford to the Independent manufacturers, deserves some quotation. Based on confidential FCC reports, the report stated, "Independent manufacturers produce as satisfactory equipment for the purpose intended, as does the Western Electric Co." Purchase of equipment by Western Electric from Kellogg, Stromberg-Carlson, and others was cited as proof.

This, of course, is hardly news to readers of TELEPHONY, but it's something to know that it's now official.

EVEN IF THE FCC did put into practice a competitive bidding policy for the supply of manufactured equipment to Bell operating companies, it would still be a relatively mild reform compared with the attitude taken by the Federal Power Commission in some of its valuations of hydroelectric properties. In such cases, where work was done or services performed by a corporation affiliated with the operating corporation, the commission refused to allow any profit to the servicing company whatever.

Services performed between affiliated corporations, in other words, must be valued at cost. Probably the Federal Power Commission will take the same attitude in fixing rates for interstate electric utilities under the new jurisdiction granted to that commission by Title II of the Federal Public Utility Act of 1935.

And while on this subject, it might be interesting to note that in Title I of the same act which applied to utility holding companies, the parent concerns are forbidden to engage in service operations at all while similar activity by subsidiaries are placed under any restrictions the Federal Securities and Exchange Commission may see fit to impose. Here is a passage quoted from the act (Title I, Sec. 13-b):

> After April 1, 1936, it shall be unlawful for any subsidiary company of any registered holding company or for any mutual service company, by use of the mails or any means or instrumentality of interstate commerce, or otherwise, to enter into or take any step in the performance of any service, sales, or construction contract by which such company undertakes to perform services or construction work for, or sell goods to, any associate company thereof except in accordance with such terms and conditions and subject to such limitations and prohibitions as the commission by rules and regulations or order shall prescribe as necessary or appropriate in the public interest or for the protection of investors or consumers and to insure that such contracts are performed economically and efficiently for the benefit of such associate companies *at cost*, fairly and equitably allocated among such companies. (Italics supplied.)

And so it will be seen from the foregoing that the Bell would be getting off rather lightly, compared with other utilities, if the FCC decided only on a requirement of competitive bidding for Western Electric operations. Under such circumstances, Western Electric would still be allowed to make a profit over cost, if it could. The only difference would be that it would have to put its bid on the line with the other concerns and take its chances of making a profit over cost or otherwise.

If this comes to pass, it might result in Western Electric staying more on its toes; and, offhand, it seems as if it should be a pretty good break, not only for the Independent manufacturers, but perhaps for the Independent telephone companies as well. After all, operating companies can hardly lose where the supply men put on an active trade battle.

# ADJUSTING FREQUENCY RINGERS

By HARRY CHAPMAN

**METHOD OF adjusting harmonic ringers to obtain maximum efficiency in actual performance**

IN PREPARING this article it is the writer's desire to set forth a method of adjusting harmonic ringers whereby the maximum amount of success may be obtained. After a study and some experimentation the following plan of procedure was found to be the most successful.

Obtain a set of thickness gauges as near as possible to these thicknesses: .008, .012, .024 and .055. The gauges are to be used to measure the air gap between the ringer armature and poles of magnets. The gauges themselves are not so important and the writer will not attempt to give a definite amount of thickness to use, for ringers differ, due to long usage or rough handling.

The ringer should first be thoroughly examined to see that no foreign matter —such as iron chips or filings—is lodged between the armature and the pole pieces, and that there are no "burrs" on the adjusting screws (if the ringer is of the type in which the adjustment screws directly into the end of the pole) to hinder the free swing of the armature. The poles should be free of gum or dust which might adhere to them.

Should there be burrs (Fig. 1) on the adjusting nuts these should be filed off and thoroughly cleaned or it will be impossible to make accurate adjustments to the reed. If the reed is adjusted very close to the pole, the armature will strike these obstructions. This will tend to stop the reed before it has reached its full swing and throw it off cycle, resulting in cross-ringing or failure to ring.

If the reed stem is bent, it should be straightened. It will sometimes be found

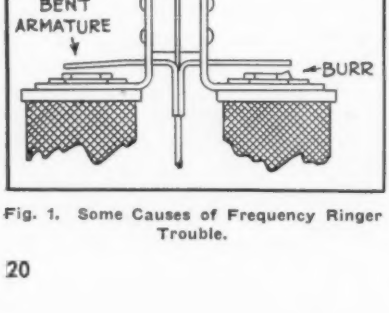



Fig. 1. Some Causes of Frequency Ringer Trouble.

that the armature is twisted or bent (Fig. 1) where some one had been trying to adjust the ringer without the proper tools. These bent armatures must be straightened if possible. It would, however, be advisable to discard this reed and use a new one.

The armature can be straightened by taking the reed off the ringer and placing it on a piece of angle iron held in a vise, as shown in Fig. 2, and hammering it out straight. It is very important that the armatures be perfectly straight if good results are to be obtained.

If there should be a small dent or bend in the armature, or a "burr" on the adjusting screw, Fig. 1, when the thickness gauge is run through the air gap its true measurement will not be obtained. The ringer in order to function properly must have the same amount of cubic air space between each of its poles and armature.

Nearly all telephone exchanges have some form of testing equipment. The circuit given in Fig. 3 was found to give best results for the purpose for which

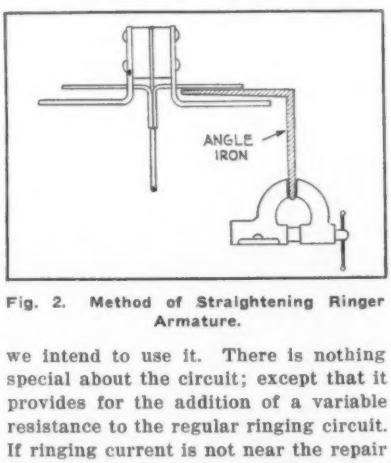



Fig. 2. Method of Straightening Ringer Armature.

we intend to use it. There is nothing special about the circuit; except that it provides for the addition of a variable resistance to the regular ringing circuit. If ringing current is not near the repair bench, it would be well to build a small test cabinet and mount it on the wall or on the bench near at hand

The only parts required to build the testing box are a harmonic key and a variable, wire-wound resistance of from 5,000 to 10,000 ohms. Although the smaller resistance will be sufficient, the larger will give a greater range. Do not attempt to operate the test box without resistance lamps or serious damage may be done to the converter.

The reader may have ideas of his own as how to mount the key and resistance, in some cabinet already in use, or in a

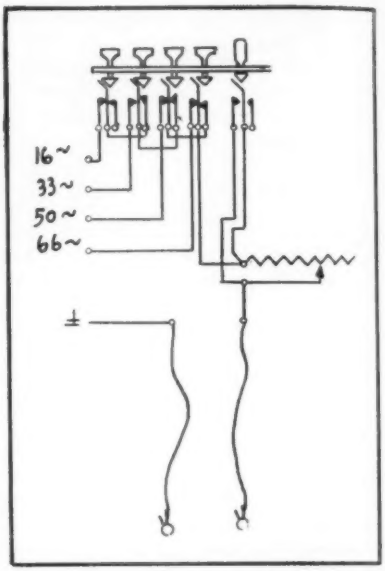



Fig. 3. Circuit for Testing and Adjusting Frequency Ringers.

small box large enough to contain the equipment, with a pair of test leads about three feet long equipped with test clips. The operator key is wired as a shunt key to cut the resistance in and out of the circuit.

Now that we have inspected the ringers, removed all foreign matter and corrected those armatures found defective, the next step is to set the armatures as far away from the pole pieces as possible. The bells or gongs should be set as far away from the clapper as adjustments will permit—or better still, remove the gongs entirely—to allow free action to the armature, for the bells do not figure in the adjustments as yet.

The first operation in adjusting harmonic ringers successfully is to set the adjusting screws on the ends of the coils as far away from the reed as possible, then connect the test leads to the ringer and try the ringing. Check the air gap between the poles and the armature with the thickness gauge, Fig. 4, using only as many leaves as is necessary to fit in this gap snugly. The adjustments should be so set that the same number of leaves will fit in each air gap without crowding.

Now try the ringer for ringing with the resistance in the circuit. The resistance should be set at about the halfway point; that is, using about one-half of the resistance. If the ringer does not vibrate very strongly, it will be neces-

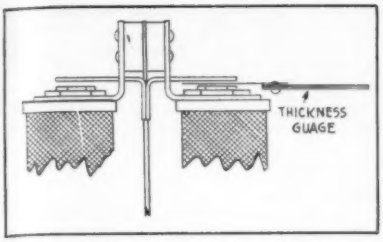



Fig. 4. Method of Checking Air Gap Between Ringer Armature and Magnet Poles.

sary to set the adjustments a little closer, using the thickness gauge to keep the amount of space on each side the same. This spacing, or "balance" as we shall call it, is just as important in the adjustment of a ringer as it is with a frequency converter.

Try the ringer again with the resistance in the circuit, then try it with the resistance cut out with the shunt key; it will be found that it will ring with a good strong ring. Try each of the other frequencies, holding the ringing key down and operating the shunt key to throw the resistance in and out of the circuit while the ringer is vibrating and note whether there is any "sloping over." If it does not ring crossed now, it will not ring crossed when placed out on the line.

No attempt is made to specify the proper amount of space for setting the armature from the poles. This will vary with different ringers, even of the same frequencies and the same make. This difference is due to the age of the ringer, the handling it has had and the condition of the magnet.

When the ringer is set to operate with a strong ring with the resistance both in and out of circuit, the next step will be to mount the gongs on their mountings with their adjusting screws set as far out as possible. Then with the ringer vibrating, bring the gongs in by advancing the adjusting screws one at a time until the clapper just strikes the gongs.

With the same amount of resistance in the circuit as in adjusting the ringer, set the gongs to give a fairly strong ring. Then cut out the resistance, and you will be rewarded with a good strong ring. Holding the ringing key down and cutting the resistance in and out of the circuit check each frequency for cross ringing.

If the foregoing procedure has been faithfully carried out it will be found once a ringer is properly adjusted it can be placed in service without a worry that it will ever cause trouble of its own accord.

If spare ringers are carried in stock, they can be adjusted as described, first as to air gap, then with the gongs mounted. If the gongs are marked as to which is "right" and which "left" and the spot marked on the rim of the gong where the clapper strikes, they can be placed back in stock until needed.

When a replacement is necessary, all one has to do is to remove the gongs, mount the ringer in the cabinet and remount the gongs in respect to the markings, and then it will be unnecessary to check proper ringing.

Once the ringers have been adjusted by this method, and a case of trouble is reported, it will invariably be found that the frequency converter has become unbalanced or that the battery is not functioning properly.

The writer had the unfortunate experience to take over an exchange of approximately 700 stations, where it was decided to replace an existing converter of the five-point type with a new converter of the three-point type. Seemingly the five-point type converter was off frequency. The new one installed was "set" to frequency with instructions to leave on frequency and adjust all frequency ringers to it.

Many trying days with mediocre results were experienced until the writer began re-adjusting the ringers with a thickness gauge. Results were only too gratifying, the work became interesting and a study of the entire operation of converters was made for the many points that could be learned. The foregoing remarks may not fit into every reader's particular case. However, if one thought can be imparted that may be of some use, this article is well worth the time and trouble of getting the material in shape for publishing.

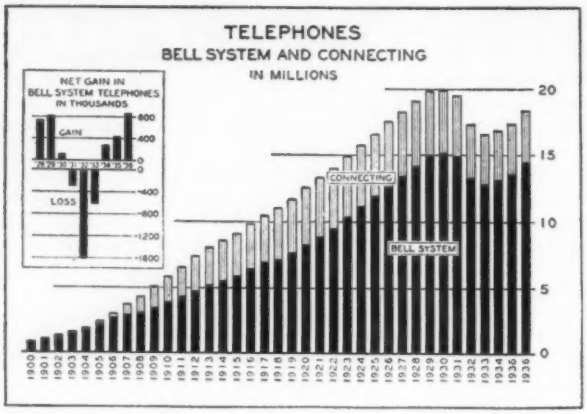
▲ ▲

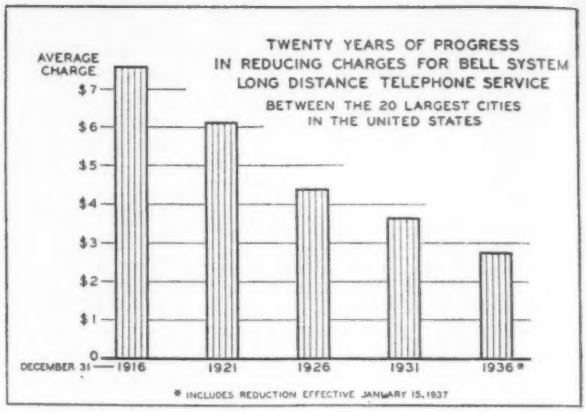
## Recent Prices in the Metal Markets

New York, N. Y., March 1: Copper—Firm; electrolytic spot and future, 15.00c per lb. Export nominal. No quotation. Tin—Easy. Spot and nearby, 54.10@25.00c per lb.; future, 53.90@54.05c per lb. Lead—Steady. Spot New York, 7.00@7.05c per lb.; East St. Louis, 6.85c per lb. Aluminum—19.00@22.00c per lb. Antimony—Spot, 16.50c per lb. Quicksilver—$93.00@95.00 per flask of 76 lbs. Platinum—$58.00 per ounce.

## TELEPHONE FLOAT ENTERED IN FLORIDA STATE FAIR PARADE

Float entered by the Peninsular Telephone Co. of Tampa, Fla., in the Annual Gasparilla Parade Held in Conjunction With the Florida State Fair, February 1. Miss Colleen Lunsford, Wearing a Powder Blue Lace Dress, Was "Sitting on Top of the World" on the Silver and Blue Float Arranged Along Horizontal Lines in a Modernistic Decorative Scheme. Around Top Edge of Float Were the Words, "The World at Your Finger Tips."




# A. T. & T. Co. Makes Best Showing Since 1929

**ANNUAL REPORT tells of progress — despite higher taxes and rate reductions—in which the public, employes and stockholders all shared. Excerpts from report tell of the company's operations and activities during the past year.**

THE ANNUAL report of the directors of the American Telephone & Telegraph Co. made public March 1 states that "the year 1936 was one of progress for the Bell System, in which the public, the employes and the stockholders all shared."

Substantiating this statement it is related that the number of telephones increased 881,000. Telephone service was maintained at record high standard. Reductions in telephone rates, including a reduction effective in January, 1937, amounted to $36,000,000 on an annual basis. Governmental bodies benefited by $22,300,000 more taxes than in 1935.

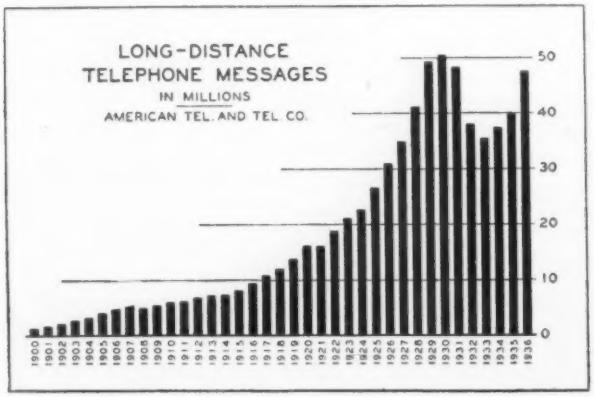
The number of employes, including those of the Western Electric Co., Inc., and the Bell Telephone Laboratories, Inc., was 28,000 greater at the end of the year than at the beginning, and payrolls were $43,000,000 more than in 1935. The usual $9 per share dividend on the stock of the American Telephone & Telegraph Co. was earned by the system with a margin of $16,600,000, or 89 cents a share.

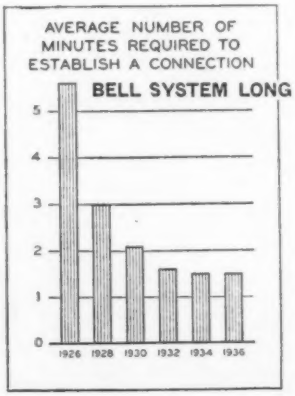
The increase of 881,000 telephones in service in 1936 compares with an increase in 1935 of 456,000 and in 1934, 298,000. There were 14,453,000 Bell telephones in service at the end of 1936. This number was still 740,000 less than the maximum development which was reached in 1930, but was 1,725,000 more than the low point of August, 1933. The system had, therefore, regained about two-thirds of the telephones which it lost during the depression.

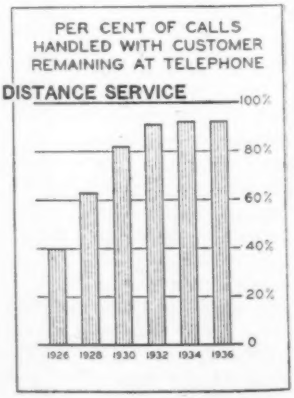
A change is made from the custom of previous years in that the statements in this report consolidate the accounts and statements of the A. T. & T. Co. and its principal telephone subsidiaries. Under this practice the non-controlled companies (the Southern New England Telephone Co. and the Cincinnati & Suburban Bell Telephone Co.) are excluded and certain controlled companies (the United Telephone Co., Abilene, Kans., Tri-State Telephone & Telegraph Co., Dakota Central Telephone Co. and Christian-Todd Telephone Co., Hopkinsville, Ky.) are included.

Including the telephones of about 6,600 connecting companies and more than

(*Continued on page 26*)



★ ★ ★ ★ ★ RURAL EXTRA

# AUTOMATIC ELECTRIC NEWS

Published Occasionally by
AUTOMATIC ELECTRIC COMPANY
1033 West Van Buren Street, Chicago

MARCH 6, 1937

# Rural Telephones Show Big Increase!

## Expanding Activity in Rural Traffic Permits Needed Repairs, Encourages Service Improvements

At last the rising tide of increasing prosperity throughout the United States is extending to the rural communities. Reports from even the most remotely-situated exchange areas show telephones are being reinstalled and reconnected at a rapidly increasing rate, and service contracts are being entered into by new users in steadily growing numbers.

Rural operating organizations are now beginning to take stock of their existing exchange conditions and are planning much needed improvements in both inside and outside plant. Worn-out and obsolete telephones are gradually being replaced by new, modern instruments—more compact in design, more convenient to use and more efficient in operation. In many cases, grounded lines are being put on a full metallic basis.

All of this activity has a double benefit. It pleases the telephone user, since every improvement the telephone company makes in its plant means better service to him. It aids the telephone company, since better service promotes good will and generates word-of-mouth advertising, which in turn results in increased demand for telephone service.

With reports of this increasing activity on the part of rural companies, word comes from the field that full use is being made of the many new developments perfected by manufacturers especially for rural exchange use. Such improved equipment is being ordered in constantly increasing amounts by small operating organizations everywhere.

Better times are assuredly on the way! In the opinion of telephone statistical experts, now is an opportune time to plan those long-deferred improvements, since better business has made such action financially possible while prices are still at a reasonable level. All signs point to the fact that the vast telephone industry is again "on the march" to better times!

## A New Supply Catalog!

Don't fail to read the announcement of our new supply catalog appearing in another part of this magazine.

Then sit right down and fill out the post card requesting a copy free of charge. You'll find it highly informative on modern telephone practices as well as an indispensable buyer's guide for telephone materials.

## *New Magneto Monophones Prove Popular Among Rural Users*

The new Automatic Electric Monophones designed especially for magneto use, are scoring a direct bulls-eye among the telephone users in small communities and rural districts. These handsome, compact instruments have the same modern styling, the same convenient handset design, the same improved transmission that has made them so popular among city users. No wonder small exchange owners everywhere are replacing their more cumbersome, old-style telephones with up-to-date Monophones as rapidly as conditions permit.

There are a variety of styles and types for every purpose: magneto desk Monophones, both of the "self-contained" type and those for use with separate ringer box; magneto Monophone wall sets, with either steel or wood cases; outdoor telephones and mine-type telephones. The generators and ringers furnished depend upon how long and how heavily loaded the lines are to which the telephones will be connected.

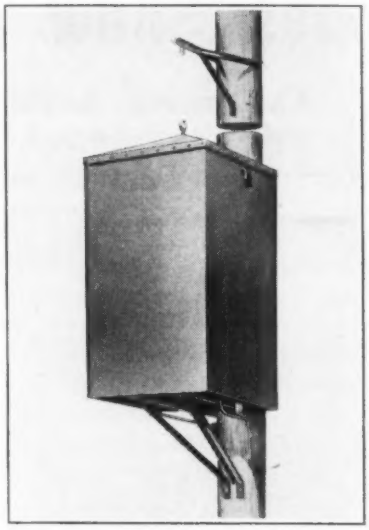
# Pole-Mounting C-A-X Brings Automatic Service to Small Areas

A new 9-line C-A-X (Community Automatic Exchange) has been developed by Automatic Electric engineers, which is already proving very popular for application to the smaller communities. Many such groups of telephone users, remotely situated and with but a limited possible number of subscribers in the area, present a difficult problem to the manually-operated exchange since the total revenue is insufficient to support an operator. With this new small-size C-A-X, however, such districts can be provided with full 24-hour automatic service on a profitable basis for the telephone company.

This compact self-operating Type 36A3 C-A-X furnishes full automatic service to nine local lines with a maximum capacity of ten stations per line. Provision is made for two trunks to the distant exchange and a maximum of two simultaneous conversations.

This is ample capacity to render excellent service to a small group of lines, yet the equipment is so compact that the whole unit, including power equipment, is housed in a metal cabinet 3 feet, 8 inches high, 2 feet, 8 inches wide and 2 feet deep. Because of the great economies effected by outdoor installation for a small unit of this type, this C-A-X has been designed for pole-mounting. All expenses for rent, heat, light, etc., are thus entirely eliminated. Also, since no operator is necessary, total operating expenses are cut to an unbelievably low figure. Of course, the unit can be installed indoors, if desired. However, pole-mounting is proving to be highly practicable, and promises to be the next important step in bringing better telephone service to users in small communities and rural districts.

***Pole-Mounted C-A-X***



***This drawing shows how the Type 36A3 C-A-X looks when installed on a pole. The cover is raised by means of a rope and pulley whenever there is occasion to inspect the equipment.***

## When You Want Supplies, You Want Them "in a Hurry!"

It is probably a rare occurrence when at least some of the supplies you order are not wanted "right away." At any event, in building up our extensive and complete telephone supply service, we have done so on the principle that every order is a *rush* order, and is to be handled on such a basis. The rapid growth of this department of our business attests the popularity of this policy among telephone managers and telephone plant men.

To give especially speedy service to telephone companies regardless of their location, requires warehouse facilities at strategically located points. For our customers' convenience, we now have completely-stocked warehouses at four locations, namely San Francisco, Kansas City, Chicago and Richmond. As can be seen, these are so located that quick service can be given telephone companies no matter in what part of the country they are situated.

Each of these warehouses is in charge of experienced telephone men who give intelligent attention to every order no matter how small it may be. Our policy insures everything you order from us being: 1st—a high quality product of standard manufacture; 2nd—"checked and double-checked" to assure that what you get is what you ordered; and 3rd—packed and shipped with unusual care to insure its arrival in perfect condition.

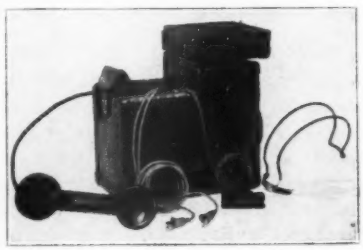
# Here's Scientific "First Aid" for Your 1937 Line Troubles!

How many times has your lineman had to open an important line to locate a case of trouble? How often does he need the cooperation of an "inside man" to find out the why and where of some apparatus failure?

With the West Test Set, none of this troublesome procedure is required. Working by himself, one man can rapidly locate shorts, opens, grounds, crosses, "high" joints, poor ground rods, swinging contacts, as well as trouble in house wiring, lightning arresters, coils, etc. All without opening heavy-traffic lines, and without the necessity for an "inside man" to help find the difficulty.

Undoubtedly this scientific, portable test set is one of the greatest time and labor savers ever invented.—a real life saver for the small exchange owner who does his own trouble-shooting and repair work. It pays for itself in a short time by conserving time and eliminating waste effort. It is the *modern* way to detect and locate line and apparatus faults of any kind, and bears the stamp of approval of many of the largest and most progressive operating organizations in the country.

***West Test Set***



***The West Test Set with cover open, ready for operation. With this scientific "short cut", the lineman working by himself can quickly and easily locate shorts, opens, grounds, etc., in both outside lines and inside wiring.***

## Special Telephone for Long, Heavily Loaded Rural Lines

For long, heavily loaded rural lines, Automatic Electric engineers have designed a special magneto telephone (Cat. No. AG-14) equipped with extra-powerful ringer and generator and other features providing unusually high operating efficiency.

Gongs are mounted on the outside of the case for greater audibility, and space is provided within the case for three No. 6 dry cells instead of the usual two. All parts throughout are of exceptionally rugged and durable construction, built to provide excellent service even under the most severe operating conditions.

***Special Telephone***

***This special wall telephone (Cat. No. AG-14) is equipped with extra-powerful ringer and generator for use on long, heavily-loaded lines.***

Telephone companies with long, multi-party lines, as well as those providing service to pipe line companies, lumber mills, railroads, forestry departments and similar enterprises where unusually troublesome conditions are encountered, will find that this specially powerful instrument "fills the bill" to perfection.

A similar special magneto instrument with extra-powerful ringer and generator, is also available equipped with the Monophone hand unit.

# Many Novel Improvements Distinguish Sands Line of Protective Equipment

The new Sands line of telephone protective equipment represents a distinct technical advance over previous protection equipment. Not only has every piece of apparatus been designed to secure definitely increased durability and ruggedness in mechanical construction, but many ingenious and important improvements in design have also been perfected which contribute to the higher operating efficiency shown by these products both in laboratory tests and in daily service. Formerly produced by Sands Electric Company, this well-established line of protective products has been taken over and is now being manufactured by Automatic Electric Company, of Chicago, Illinois.

Typical of the advanced design of Sands protective apparatus, is the "Type 2105" discharge block, which is standard equipment on all sub-station protectors and protected cable terminals. This device is an air-gap, carbon-to-carbon type which under s e v e r e conditions, grounds the line automatically—then resets itself after these conditions have passed. The carbon-to-carbon surfaces do not burn away as do metal-to-carbon gaps, and the air-gap construction eliminates trouble from dust and moisture, often encountered in dielectric types.

With this superior discharge block, Sands equipment gives more dependable, longer-lasting protection than can be obtained from products not incorporating its features of advanced design and construction.

***Improved Terminal***

***This Type 40 Protected Cable Terminal is one of the most popular items in the Sands line. It is available in capacities of 3, 5 and 7 pairs and comes regularly equipped with Type 2105 Discharge Blocks.***

## *In Selection of Drop Wire, Strength Is Most Important Factor to Consider*

One of the most important factors in the long life and satisfactory performance of sub-station wiring, is the use of a drop wire of high tensile strength. Telephone men often lose sight of this fact, and later on experience excessive trouble from drop wire breakage during sleet and wind storms, causing useless expense for repairs and replacements.

Emphasis on this feature of extra-strength makes Monotype Copperweld the preferred drop wire of the present day. This well known brand is made by a special patented process whereby a core of solid steel is encased with a heavy collar of pure copper, the metals being welded together by this special process in an inseparable union. This solid core of steel gives to Monotype Copperweld the greatest strength of any drop wire on the market, namely over 200 pounds per wire. Another factor of great importance to the life of the insulation is the high elastic limit of Monotype Copperweld, which prevents stretching of the conductors.

There are many other drop wires which are available at approximately the same cost as Monotype Copperweld, but they are not necessarily as economical in the long run, since most of them are not nearly so long-lived in actual service.

(*Continued from page 22*)

25,000 connecting rural lines, there were at the end of the year approximately 18,360,000 telephones in service in the United States. Further extensions were made in overseas radio telephone service and at the end of the year 68 countries could be reached by telephone.

The average daily number of telephone conversations for the system during the year was 65,000,000. There were 7.6 per cent more local conversations and 12 per cent more toll and long distance conversations than in 1935.

Total operating revenues of the system were $994,800,000 and operating expenses, except taxes, were $659,000,000. Operating taxes were $116,300,000. Net operating income was $219,500,000 and other income, which includes the system's proportion of the earnings of the Western Electric Co. and its subsidiaries, was $28,800,000.

The total income available for interest and dividends was $248,300,000. The net income of the system applicable to stock of the A. T. & T. Co. was $184,700,000, or $9.89 per share compared with $7.12 per share in 1935.

At the end of the year there were 641,000 stockholders of record in the A. T. & T. Co. The average number of shares held per stockholder was 29. Geographically, the stock is widely held. No stockholder of record holds as much as 1 per cent of the total stock. Approximately one-third of Bell System employes own stock in the company. Including the holders of common and preferred stocks of the company's principal telephone subsidiaries and excluding duplications, there are about 715,000 Bell System stockholders.

At the end of 1936, the total assets of the Bell System were $5,149,000,000, of which $4,259,000,000 was invested in telephone plant. During the year plant additions amounted to $244,000,000, and plant retirements to $173,000,000, resulting in a net increase in plant of $71,000,000.

Cash assets of the system at the end of the year, including funds temporarily invested in government obligations, but exclusive of $179,286,000 held for retirement of bonds maturing or called for redemption, were $219,500,000, of which amount the A. T. & T. Co. held $180,200,000.

Bell System taxes continued to increase. The 1936 total of $116,800,000 was $22,300,000 greater than in 1935. Taxes were equal to $8.36 per telephone in service, $5.98 per share of common stock outstanding, and $470 per employe.

"Although telephone service," says President Walter S. Gifford, in the report, "must be given 24 hours a day and seven days a week, the Bell System, including the Western Electric Co. and the Bell Telephone Laboratories, maintains a five-day work week with a maximum of 40 hours, except in minor instances, where service requirements or local conditions make it either impracticable or unsuitable. This compares with a 5½ or 6-day work week prior to the depression.

"A total of 66,000 people were hired in 1936 to replace losses from the force and to handle the increase in business. Of the number hired, more than 30,000 were employed as telephone operators. As the majority of these operators were inexperienced, the problem of giving satisfactory telephone service was made more difficult; but aided by improved training methods it was possible to maintain service of record high quality.

During 1937, it is probable that the number of inexperienced operators to be hired and trained will be substantially larger than in 1936. This condition together with increasing use of facilities will present further problems, but it is confidently expected that they will be successfully met.

There is full realization in the Bell System that the approval of the public is essential to its success and that such approval is fundamentally dependent on the most and best possible telephone service at the lowest possible cost."

Reference is made to reductions in rates for overseas service since it was started 10 years ago. As an example, of the reductions it is stated that the original charge for a three-minute New York to London call was $75; now it is $21 and at night and all day Sunday, $15.

A table of long distance rates in this country is given as illustrative of the reductions which have been made in approximately ten years.

"Bell System charges for handset telephones," the report continues, "were reduced during the year in 33 states, in line with the established policy of reducing these charges as rapidly as conditions in the various states permit until they are entirely eliminated.

| | Dec. 31, 1920 | Dec. 31, 1925 | Dec. 31, 1930 | Dec. 31, 1935 | Dec. 31, 1936 | Increase* During 1936 |
|---|---|---|---|---|---|---|
| Number of telephones† | 8,133,759 | 11,909,578 | 15,187,296 | 13,573,025 | 14,453,552 | 880,527 |
| Number of central offices | 5,767 | 6,147 | 6,639 | 6,896 | 6,921 | 25 |
| Miles of pole lines | 362,481 | 394,529 | 428,212 | 407,454 | 404,161 | *3,293* |
| Miles of wire: | | | | | | |
| In underground cable | 14,207,000 | 27,769,000 | 45,116,000 | 47,639,000 | 48,195,000 | 556,000 |
| In aerial cable | 6,945,000 | 12,835,000 | 23,777,000 | 26,425,000 | 26,639,000 | 214,000 |
| Open wire | 3,711,000 | 4,339,000 | 5,231,000 | 4,562,000 | 4,539,000 | *23,000* |
| Total | 24,863,000 | 44,943,000 | 74,124,000 | 78,626,000 | 79,373,000 | 747,000 |
| Per cent total wire mileage in cable | 85.1 | 90.3 | 92.9 | 94.2 | 94.3 | ..... |
| Average daily telephone conversations:‡ | | | | | | |
| Exchange | 31,818,000 | 48,051,000 | 61,150,000 | 58,066,000 | 62,485,000 | 4,419,000 |
| Toll and long distance | 1,307,000 | 2,090,000 | 2,884,000 | 2,224,000 | 2,490,000 | 266,000 |
| Total | 33,125,000 | 50,141,000 | 64,034,000 | 60,290,000 | 64,975,000 | 4,685,000 |
| Total plant | $1,373,802,000 | $2,566,809,000 | $4,028,836,000 | $4,187,790,000 | $4,259,263,000 | $71,473,000 |
| Number of employes†† | 228,943 | 292,902 | 318,119 | 241,169 | 255,814 | 14,645 |
| Number of A. T. and T. Co. stockholders | 139,448 | 362,179 | 567,694 | 657,465 | 640,991 | *16,474* |

* Decreases shown in italics.

† Excludes private line telephone numbering 81,087 on December 31, 1936. Including telephones of about 6,600 connecting companies and more than 25,000 connecting rural lines, the total number of telephones in the United States which can be interconnected is approximately 18,360,000.

‡ For year ending December 31.

†† The employes of the Western Electric Co., Inc., and the Bell Telephone Laboratories, Inc., numbering 38,548 on December 31, 1936, are not included.

Comparative Bell System Statistics for 1936 and for Five-Year Periods from 1920-1935.

"Total reductions in Bell System telephone rates in 1936, together with the reduction in long distance telephone rates effective January 15, 1937, amounted, on an annual basis, to about $36,000,000, although the revenue loss, particularly in the case of long distance rate reductions, will be less, due to additional business stimulated by the lower rates.

Some of these rate reductions were ordered by regulatory bodies, some were initiated voluntarily by the companies, and others were the result of conferences and informal discussions with the regulatory bodies concerned.

The companies have been glad to participate in such conferences, feeling that discussions, conducted in a spirit of fairness and with opportunity to develop and consider all pertinent facts, are a more satisfactory basis for regulation than are the highly technical, prolonged and controversial formal hearings that have so often developed around rate questions."

In discussing fundamental research and development during the past few years, it is stated that, viewed from the standpoint of a more extended, better and more economical communication service, it seems from what has been accomplished that these years may have been prospectively more productive than any corresponding period since the inception of the business.

"During 1936, research and development work has gone forward on many new things which are potentially important to the business in the future," President Gifford states. "Substantial progress has been made towards completion for commercial use of new subscribers' equipment, new forms of central office switching machinery, new applications of multi-channel high frequency methods of transmission over circuits of the conventional type, a radically new form of transmission circuit—the coaxial cable—and certain aspects of radio telephony.

"The service trials of the new subscribers' apparatus have been substantially completed and work is under way to make these instruments generally available.

Further research and development work on the improved switching mechanism has been pushed vigorously during 1936, not only in the direction of completing a large central office service trial installation but likewise in the direction of applying the new mechanism elsewhere where switching problems exist.

| Operating Revenues | Year 1936 | Year 1935 |
|---|---|---|
| Local service revenues | $665,152,512 | $628,104,519 |
| Toll service revenues | 306,238,511 | 271,158,136 |
| Miscellaneous revenues | 26,657,445 | 23,693,084 |
| Less uncollectible operating revenues | 3,196,336 | 3,839,516 |
| *Total operating revenues | $994,852,132 | $919,116,223 |
| **Operating Expenses** | | |
| Current maintenance | $182,063,578 | $172,636,899 |
| †Depreciation expense | 160,963,777 | 168,714,063 |
| Traffic expenses | 139,483,912 | 129,420,362 |
| Commercial expenses | 78,276,690 | 73,530,114 |
| Operating rents | 13,452,768 | 13,544,622 |
| General and miscellaneous expenses: | | |
| General administration, including cost of development and research | 23,168,875 | 21,749,143 |
| Accounting and treasury departments | 34,575,687 | 33,467,780 |
| Provision for employes' service pensions | 11,131,889 | 11,139,738 |
| Employes' sickness, accident, death and other benefits | 7,028,183 | 6,683,082 |
| Other general expenses | 11,481,631 | 12,689,923 |
| Less expenses charged construction | 2,601,841 | 2,127,115 |
| Total operating expenses | $659,025,149 | $641,448,611 |
| Net operating revenues (carried forward) | $335,826,983 | $277,667,612 |

| | Year 1936 | Year 1935 |
|---|---|---|
| Net operating revenues (brought forward) | $335,826,983 | $277,667,612 |
| Taxes: | | |
| Federal income (includes $86,106 provision for surtax on undistributed earnings in 1936) | 28,113,057 | 20,156,232 |
| Social Security (excludes $460,007 charged construction) | 3,714,729 | ..... |
| Other—principally state and local | 84,511,651 | 74,350,633 |
| Total operating taxes | $116,339,437 | $ 94,506,865 |
| Net operating income | $219,487,546 | $183,160,747 |
| Other income: | | |
| Dividends from controlled companies, not consolidated | $ 18,399,364 | $ 2,446,500 |
| Proportionate interest in earnings or deficits (after dividends) of controlled companies, not consolidated | 2,166,270 | 2,276,480 |
| Dividends from non-controlled companies | 3,842,994 | 3,634,071 |
| Interest, and miscellaneous items—net | 4,456,213 | 5,989,877 |
| Total income (before fixed charges) | $248,352,387 | $197,507,675 |
| Interest deductions | $ 49,796,463 | $ 51,168,840 |
| Amortization of discount on funded debt and other fixed charges | $ 718,245 | $ 1,074,481 |
| Total net income | $197,837,679 | $145,264,354 |
| Net income applicable to stocks of subsidiaries consolidated held by public: | | |
| Preferred stocks | $ 6,853,650 | $ 7,016,186 |
| Common stocks | 6,239,565 | 5,329,675 |
| Net income applicable to A. T. & T. Co. stock‡ | $184,744,464 | $132,918,493 |
| Dividends on A. T. & T. Co. stock | 168,081,179 | 167,960,475 |
| Balance for consolidated surplus applicable to A. T. & T. Co. stock | $ 16,663,285 | $§ *35,041,982* |

Note: The annual reports of this company have in the past contained consolidated "Bell System" financial statements and other data covering the American Telephone & Telegraph Co. and its associated telephone companies. This group included The Southern New England Telephone Co. and The Cincinnati & Suburban Bell Telephone Co., in each of which this company has a substantial, but less than a controlling, interest. Consistent with the requirements for Federal registration of new issues of securities, the company is excluding from its consolidated financial statements these non-controlled companies, and is including therein certain telephone subsidiaries not heretofore consolidated.

†Depreciation expense represented 4.12 per cent of average investment in depreciable plant in service during 1936 and 4.32 per cent during 1935.

*Revenues shown include relatively minor amounts subject to possible refund in the event of adverse decisions in pending rate cases.

‡Equivalent to $9.89 per share in 1936 and $7.12 per share in 1935 on average number of shares outstanding.

§Negative amount.

**Bell System Earnings' Statement With Comparative Figures for 1935. Figures Are Included of Tri-State Telephone & Telegraph Co., St. Paul, Minn., Dakota Central Telephone Co., Aberdeen, S. D., United Telephone Co., Abilene, Kans., and Christian-Todd Telephone Co., Hopkinsville, Ky., While Those of the Southern New England Telephone Co. and the Cincinnati & Suburban Telephone Are Excluded. The Two Latter Companies Are Non-Controlled But the Other Four Are Controlled by the A. T. & T. Co.**

# TWIN Selling

**Copy and illustration in the advertisement on the opposite page do a double job. First, they suggest toll usage. Second, they promote the convenience of an extension telephone. This bleed page is one of a consistent series. It appears in national magazines of large circulation during February and March, and should help to stimulate good will as well as business for the entire telephone industry.**

**An Advertisement of the Bell Telephone System**

twice as much fun
—to telephone
elephone call doubles the pleasure of hearing from people. You
r them . . . they hear you! It's a voice-to-voice visit that gives
surance as well as happiness and cheer. When Dad's away . . .
oungsters in college . . . relatives scattered across the country—
he telephone is a constant bond of personal, two-way happiness.
It's fun to use Long Distance.
And now, with the many lower interstate Long Distance
rates in effect January 15, it costs less than ever to reach out
across the miles—by telephone. Why not try it tonight?
An inexpensive bedside extension telephone is a step
and energy saver. Ask your local telephone office.

A new private branch exchange employing this apparatus has been under trial for several months and it is expected that manufacture for general use will be started during 1937. Likewise, work has been undertaken in the direction of application in the field of toll line switching.

### *Research and Development Work*

In the field of broad band carrier systems, the research and development work has now reached the point where trial installations of commercial forms of such systems for use on cable and open-wire circuits are being made. In the case of cable circuits, the system is planned to yield 12 telephone circuits from two pairs of wires.

While not all of the pairs in existing cables can be equipped simultaneously with this multiplex system, its introduction will permit increasing the message-carrying capacity of the existing longer cable routes several fold, the carrier system being applied to the longer circuits and existing voice frequency methods to the shorter circuits. In the case of open-wire circuits, the new systems when applied will yield a total of 16 telephone circuits for each pair of wires.

The initial trial installation of coaxial cable between New York and Philadelphia was completed in the fall of 1936 and extensive experiments are under way. Thus far the results have confirmed anticipation and, while there is still a large amount of research and development work to be done, there is every reason to believe that this radically new and very simple form of communication circuit will in the future have wide application, particularly over the longer high traffic density routes.

All of these accomplishments in the application of high-frequency broad band technique are the result of years of development work extending uninterruptedly throughout the depression.

During 1936, plans were initiated for materially increasing the effectiveness of the transatlantic short wave radio circuits. As a result of research work in the Bell Telephone Laboratories, single sideband operation, highly directive receiving antennas and new transmitting antennas have been developed, and it is expected that during the current year they will be applied gradually. They will materially better the performance of transatlantic telephone circuits and reduce the out-of-service time due to adverse atmospheric conditions.

A large further trial installation of buried wire underground distribution for rural service was made in 1936. Several hundred miles of the new wire have been installed by means of a special plow which buries the wires along highways and into premises with comparatively little disturbance of the ground surface. Unless something now unforeseen occurs, this new system bids fair to have large and advantageous use."

### *Bell States FCC Probe Is One-Sided So Far*

Only slight reference is made to the investigation being conducted by the FCC. The various appropriations, totaling $1,500,000, are referred to and then the investigation is dismissed with this statement:

"So far (up to February 17, when the report went to press) the investigation has been one-sided. In spite of repeated protests, the company has not been permitted to present its witnesses or to cross-examine the witnesses of the commission."

In summing up the result of the year's operations, President Gifford ends his report with an optimistic statement and words of encouragement for the future.

"During 1936," he says, "there was work for more employes, more money in the pay envelope, wider use of a telephone service generally recognized as the best in the world, lower cost of telephone service to the public through reductions in many telephone rates, and the usual dividend on the company's stock was earned with a small margin.

"Based on the record of the system in the depression, whatever may be the problems which the future may add to those already faced, the men and women of the Bell System can be counted on to press forward to greater accomplishments with the skill, enthusiasm and courage which they have shown in the past."

## DOERS AND ONLOOKERS

**By MISS ANNE BARNES**

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

DO YOU REMEMBER the spelling matches we used to have when we were children? How the leaders, in choosing from the group, tried first to select the best spellers for their respective sides before choosing those considered fair or poor spellers? The good spellers on one side or the other won the match; the poor spellers on the winning side just happened to be on that side. They deserved no more credit for the success of their side than did the poor spellers on the losing side.

The contest was really between the good spellers on both sides, because the poor spellers on both sides soon sat together on the side line and enjoyed the work of the good spellers on their respective sides. And, because they were only onlookers at the achievement of others, they could not experience the same feeling of joy as the good spellers felt.

The game of life is very much like that. There are the *doers* and the *onlookers*. The *doers* are not content to bask in the achievement of others. Come what may in the way of obstacles, their desire is to experience the joy of creation or accomplishment in some outstanding way. Eventually they do.

The *onlookers* sit on the side lines and enjoy or criticize the efforts and accomplishments of the *doers*. They live either on inherited money and so feel less incentive to bestir themselves, or they have to depend on their own limited earning power. In either case they lack *ambition* to make a real effort to achieve in spite of obstacles.

Don't depend on the success of the *doers* to bolster up your success in life, or your enjoyment. You will never know real joy in achievement until you make your *own* dream come true.

## Uses Bible Quotation As Collection Aid

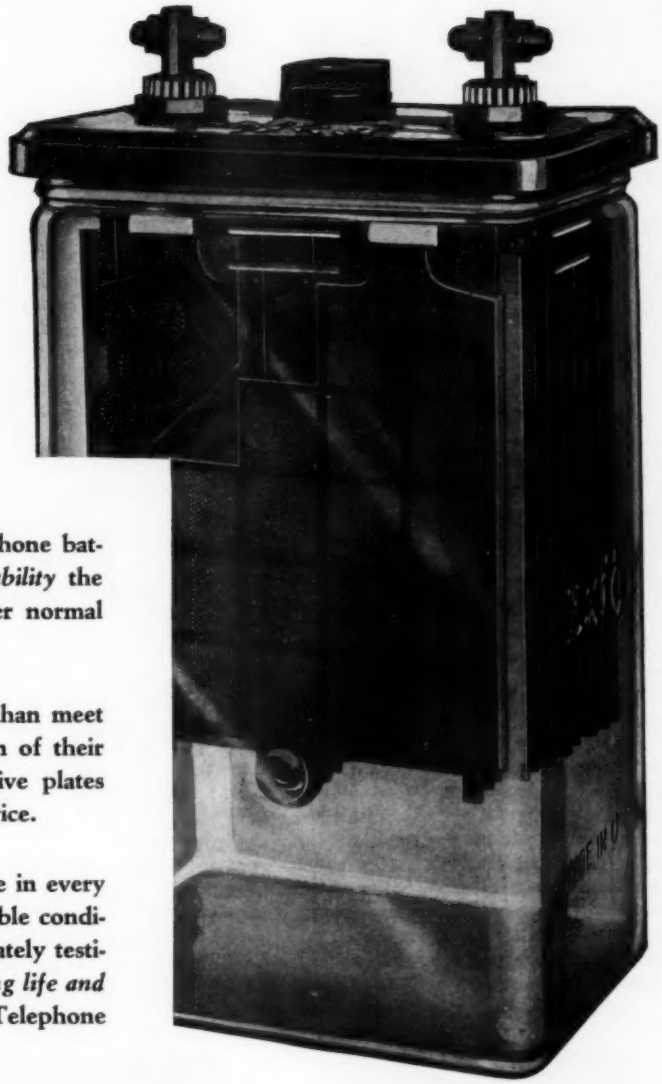
Up in Vermont they read the Bible. Realizing this fact, A. T. Davis of the Molly's Falls Telephone Co., which operates in the towns of Marshfield and Cabot, Vt., recently used a new method of reminding subscribers when their bills were overdue. With their bills his subscribers received a slip which read in part: "Isaiah 55:1 Telephone service cannot be provided that way. . . ."

As a result, Mr. Davis' delinquent subscribers paid up at once, for when he quoted the Bible he was speaking their own language. One of them, in sending his check, wrote, "John 14:1," which reads: "Let not your heart be troubled. Ye believe in God, believe also in me."

Isaiah 55:1 reads: "Ho, every one that thirsteth, come ye to the waters, and he that hath no money. Come ye, buy and eat; yea, come, buy wine and milk without money and without price."

# *POWER when you want it!*

**Here is a battery built to give you the power needed, at the voltage required—whenever you want it!**



The fundamental requirement of any telephone battery is that it delivers *with absolute dependability* the power needed — when needed — under either normal or emergency operating conditions.

Exide Chloride Telephone Batteries more than meet this requirement since the unique construction of their famous Manchester Positive and Box Negative plates assure a much longer life of dependable service.

More than forty years of satisfactory service in every kind of telephone work, under every conceivable condition, in every part of the country have adequately testified to the claims of *absolute dependability, long life and economy* that are made for Exide Chloride Telephone Batteries.

# Exide

## BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

*The World's Largest Manufacturers of Storage Batteries for Every Purpose*

Exide Batteries of Canada, Limited, Toronto

# Plant Men Talk Things Over

## Blackbirds Cause Swinging Short-Circuit

A troubleman of the New Jersey Bell Telephone Co. recently discovered a new cause of trouble in a "swinging" or off-and-on short-circuit case which gave him a merry chase. The trouble appeared periodically, with no apparent cause. Climbing poles to make tests, the troubleman found that the short was sometimes in one direction, sometimes in another.

He was mystified until he finally discovered the cause—a flock of blackbirds flying in the vicinity, stopped at intervals to perch on the wires. When they did this, one wire sagged enough to contact another, causing a short.

When the troubleman reached the vicinity, the startled birds flew away, so that the condition was not in evidence when he was at hand. When he discovered the cause of the trouble, he decided there was nothing he could do about it—unless he could fly.

▼ ▼

## "I Wonder Why" of a Telephone Engineer

By Ray Blain

"I Wonder Why" construction truck manufacturers do not provide some type of cover to protect the winch shaft opening where it extends out through the side of the body?

This shaft extension is necessary to use a power take-up reel and nigger head. We found that when this opening was not covered, rain entered and soaked one entire tool compartment, causing all the tools to rust.

After this happened several times and expensive tools were seriously damaged, we started looking for some means of providing a permanent remedy. Several types of covers were tried without success, and we were unable to learn of anyone who knew of a successful means of closing this opening.

We finally decided that a cap to slip over the shaft, with an extension plate to cover the opening, would be satisfactory. We next located a metal worker who quickly constructed the one shown in the illustrations, using an electric welder.

The bolt which holds the cap in place should be free so that it turns without binding. This is necessary so that should the winch be accidentally started with the cap in place, no damage will be done. We have used this arrangement for several months with complete satisfaction.

▼ ▼

## The Uneventful Life of a Trouble-Shooter

By Doc

How well I remember, and I shall never forget, my first switchboard trouble job in a large exchange. The switchboard was U-shaped and consisted of 24-positions—local, rural and toll. The same multiple served all positions although the operators had to have a reach like Jack Johnson. The board was equipped with line but no cut-off relays as the lamp circuit multipled through each jack and was opened when a plug was inserted.

This arrangement caused no end of trouble, for dust would settle on the open contacts and when the plug was removed, the lamp circuit would be left open. We devised a tool to insert in the jacks and clean the lamp contacts. When a line was reported "Can't get Central," we would set it up on a "short" and then run down the multiple, cleaning contacts until the line signal came in. We sure had a good time average on trouble cleared as less than a minute was generally required to clear trouble in this manner.

A part of this switchboard, which was the original installation, had seen some extremely hard service. The plug seats would wear out, and the wood was so badly worn that we were unable to get screws to hold new plug seats in place. Finally we were forced to replace the plug shelf and refinish the piling rail. This was anything but an easy task but it did solve our problem.

The multiple jacks on this board were not mounted in strips of 20 but in blocks of 100. The jacks were individually-mounted and were held in place by a small screw from the front. A single jack could be removed for repair and then replaced, if the maintenance man was good. Each jack, as I remember it, had eight wires and that made quite a bundle. One certainly had to know his multiple wedges before he could hope to work on that board.

The rural position was always busy and none of the operators wanted to work on it. The rural lines were all overloaded and long code ringing was necessary. All calls on these lines fluttered the ringdown drops and the operators were required to distinguish the single long ring, which was the universal call for the central office.

The operating room was heated by two old-fashioned coal stoves and were supposed to be stoked by an old broken-down lineman who, having been injured in an accident, had a lifetime job with

The Unprotected Winch Shaft Opening in the Side of the Construction Truck Body, Which Is the Common Arrangement.

Cap Type Protector Designed to Slip Over Winch Shaft Opening and Keep Rain From Entering Truck Body and Causing Damage to Tools.

With Cap and Plate in Place, the Opening Is Entirely Waterproof. Bolt Which Holds Cap Should Be Free So It Turns Without Binding.

the company as janitor. He was not very attentive to his duties so most of the time I stoked the fire myself. To keep all the operators comfortable was an impossibility, for some were always smothering while others swore they were freezing to death. I wonder whether a modern air-conditioning system can keep a bunch of operators happy; if so, it must be wonderful.

This old switchboard gave good service but could not be compared to present-day efficiency. I will wager that a modern feature switchboard of 12 positions or less, could have handled the entire loan of our 24 positions.

Often large ocean liners costing millions are junked as being too expensive to operate in comparison with more modern and improved vessels. In contrast with this, old switchboards are generally used as long as possible, or until they meet the fate of the old one-horse shay, regardless of how many improvements have been made in new equipment or how much could be saved in operating cost by going modern. Such is the way of this telephone world of ours.

"Doc's" Duties as Trouble-Shooter in the Early Days Were Supplemented by Helping Stoke the Two Stoves in One Exchange, and Some of the Telephone Operators "Were Always Smothering While Others Swore They Were Freezing to Death. If Modern Air-Conditioning Can Keep a Bunch of Operators Happy, It Must Be Wonderful."

▼ ▼

## Installation of Buried Wire on Mountain Slope

An unusually severe test is being given to the recently-developed underground rural wire, in a three-mile installation on the south slope of Mt. Hood, Oregon's loftiest mountain peak, about 60 miles from Portland. This initial installation of this special wire by the Pacific Telephone & Telegraph Co. is designed to furnish telephone service to the new Mt. Hood Timberline Lodge, located at a 5,900-foot elevation on the slope of this two-mile-high mountain.

The lodge, by the way, was recently constructed under the supervision of the U. S. Forest Service as a center for winter and summer sports. It was scheduled to be ready for use early this year. To connect the government camp on the Mt. Hood highway with the lodge, a six-mile trip in an automobile, outside plant men of the Pacific company under the direction of Engineer R. L. Harris, of Portland, selected the shortest possible cross-country route for laying the new wire, measuring nearly three miles.

The first step was to dig the trench approximately 16 inches deep through a terrain containing boulders of assorted sizes, numerous stumps and sandy volcanic ash. The wires were then placed in the trenches, the pairs being spaced about four inches apart. Every 100 feet a half turn was given to each wire in order to reduce crosstalk; and every 3,000 feet a test terminal was installed on a 30-foot pole, there being four terminals in all on the line.

It is believed that these poles are tall enough to escape being buried by the snow. Should trouble develop during the season of deep snow, a section between any two test poles can be isolated and repaired temporarily by placing covered wire over the snow.

▼ ▼

## Pilot Wires Adjust Cable Current to Temperature

Voice currents require less energy on circuits in long distance telephone cables on cold days than on hot ones. For example: On a 200-mile, long distance telephone circuit in cable, nine times as much current is required on a hot day as on a cold one. To overcome this difficulty a temperature recorder and current regulator has been developed by the Bell Telephone Laboratories, which, by means of a thin pilot wire inside the cable, adjusts the current to suit the temperature.

There are now in service about 16,-

Reliable

PROTECTED CABLE TERMINALS

The all metal B-27 is modern and outstanding in design with added assurance of long "terminal life."

Made in three types for three standard cable terminal fuses. Upon request we will send a sample for your inspection without charge.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

000,000 miles of long distance telephone wire in the United States, 30 per cent of which is in cable. Temperature recorders and current regulators are operated at intervals of 100 to 200 miles on certain long distance cables, so that changes from cold to hot or vice versa respond to the changes in the pilot wire, which automatically adjusts the volume of the current. No human being could be as accurate as this device, which is particularly valuable in the summer months.

On a hot day a sudden rain storm may blow up, cooling the cable, which will reduce the amount of current necessary. The pilot wire automatically reduces the amount of current necessary in the operation of these circuits. The pilot wire transmits the message and the regulator makes the change immediately.

Telephone calls are completed and people talk just as satisfactorily whether it's hot or cold. As far as they are concerned, nothing out of the ordinary has happened.

# "Telephony's" New Department—A "Kink" Column

Almost every telephone man has some one thing or "kink" which other telephone men would like to know to aid them in their work. It has been suggested that TELEPHONY publish a "kink" column for the exchange of information and ideas, so a start is made with "kinks" recently received. As other "kinks" are sent in by readers desirous of keeping such an "exchange of information" column going they will be published.

Some time ago one of TELEPHONY'S good friends discussed ways of doing things. "Everyone," said he, "has 'one best way' of doing things which he has adopted out of the experience of years. May be it is the manner of throwing a line to a man on a pole, coiling rope or some other thing. If you could get the construction and maintenance men to tell about their 'one best way' of doing a thing, it would be mighty interesting to all of us."

So here is the opportunity for obtaining new ideas for use in telephone work. Keep the column going! Send in your "kink" now!

## Operating Pilot Light on a Drop Switchboard

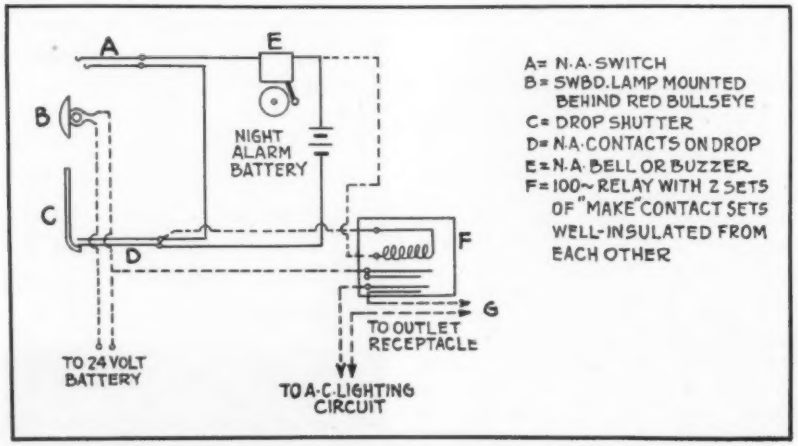
I enclose a diagram of wiring used to operate a pilot light on a drop switchboard, also to operate a room light, whenever any drop falls. The pilot light is of great convenience to day operators during the slack period. The room light is of particular benefit to the night operator since it is not necessary for her to hunt for a light switch when a drop shutter, C, falls, the light coming on automatically.

In use on our board I mounted an ordinary flush receptacle, G, at one end of the board so a table lamp, floor lamp or switchboard lamp could be plugged in as desired. Thus the room light is only on as desired. The pilot light, B, is on day and night, whenever a drop is down. In our case, this is a 24-volt lamp and is powered by the 24-volt battery used for emergency ringer, operators' transmitters and the few common battery lines we have. A 6-volt lamp might be used with an ordinary car battery if a 24-volt battery is not at hand.

The relay, F, is a standard "2 sets make" contact, with the contact sets insulated from each other. Particular care should be taken that none of the alternating lighting current from the one set of contacts reaches any switchboard wires or the frame and that the alternating current leads are isolated from the switchboard wires and coils so as not to cause induction.

We have had this arrangement in operation for several months and are well pleased with the results. A word of caution might not be amiss regarding night alarm batteries. These have their load more than doubled, since they must operate the relay day and night. They should, therefore, be examined regularly every month for condition.

Panora, Iowa — J. T. Kilmer




Circuit Sketch Showing Method of Operating a Pilot Light on Magneto Switchboard.

## A Temporary Repair That Is Easily Seen

It sometimes happens that when a copper line is broken down, more of the wire will be destroyed or stolen than the repairman has with him for replacement, making it necessary to fill in with iron wire to get the circuit working. Instead of making a regular Western Union or sleeve joint, I prefer to make one of the "haywire" type. I merely loop the two wires together, twisting the ends back around themselves, then leaving the copper tail long enough to wrap firmly around the iron.

This makes a good joint for temporary purposes and, above all, it will be seen by the first telephone man to come along and the joint properly repaired before it causes trouble. The better types of joints with the iron wire and copper splice would also be a source of trouble and the joints would not so easily be found.

Central Lake, Mich. — B. R. Sage

# Here and There in the Field

## Telephone Memo Pads Have Wide Distribution

Nearly 400,000 small pads were distributed last summer to customers of the Mountain States Telephone & Telegraph Co. in the seven states which it serves, and the call for them continues.

**Handy Memo Pads, Distributed Last Summer by Mountain States Telephone & Telegraph Co. to Customers, Still in Demand.**

These little pads, handy for noting shopping items or anything that must be written as a memo, were distributed from the local telephone offices. A supply of them was left on counters, and in front of the cashiers, everyone having business with the company being at liberty to take one. On this page is a facsimile of one of these pads, which measure three by five inches.

The copy on the memos furnishes a reminder to use the classified section of the telephone directory, as it saves one hours and miles of shopping. It also serves as a constant reminder that lower rates for long distance calls are effective at 7 o'clock in the evening and on Sundays. The cartoons of Sol Fingerman, familiar to everyone in the Mountain States territory through his illustrations in the directories, were used on the memos, and tie in with his work in the classified books.

Another tie-in occurs in the booklets illustrated by "Sol"—and they are mostly illustrations — picturing the events in the life of a telephone directory, which are enclosed with every statement and bit of correspondence sent out by the company.

These pamphlets are issued in series, each running serial fashion, and continuing the classified adventures depicted in the telephone book. The latest series is based on the comic cartoon idea, "balloons" carrying the words of the characters.

▼ ▼

## Operator on Flood Duty 3½ Days and Nights

"The calls must go through." The realization of the great importance of her task gave Miss Eunice Guthrie, telephone operator of the Arkansas Associated Telephone Co., courage and fortitude to stick to her post at the switchboard at Lake City, Ark., for 3½ continuous days and nights. She was awakened on Thursday night, January 22, by her first call, made by L. E. Wright to the Black Oak operator, requesting a general party-line ring so that he might warn the people living in that section, including Mangrum and Caraway, that the St. Francis river had broken through the Eastern levee and that water was rushing over the adjacent countryside.

That call started a long and hectic period for Miss Guthrie, during which she was not relieved for a single hour, owing to the illness of the chief operator and the departure of the relief operator, together with her family, to Jonesboro, because of the anticipated flooding of Lake City.

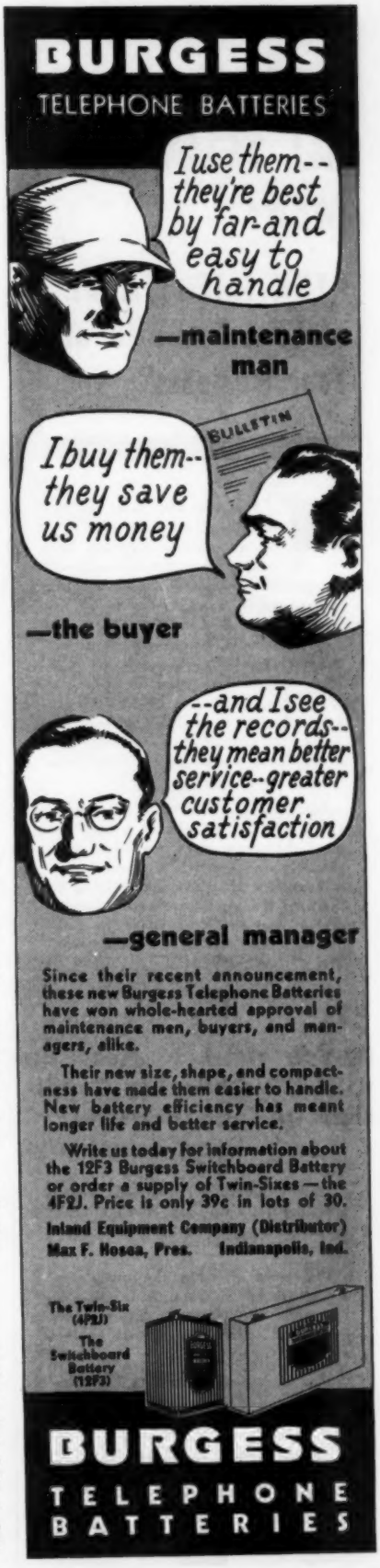
Miss Guthrie estimated that 850 long distance calls were put through during the five days, January 22 to January 26. Never before in her eight years of service as telephone operator has she experienced anything comparable to those four or five days.

The experiences of this young and attractive telephone operator during the recent Arkansas flood were written up in a feature story in the Jonesboro (Ark.) Daily Tribune.

▼ ▼

## Presides Over Directors' Meeting by Long Distance

Fred C. Goodwin, chairman of the board of directors of the Rochester (N. Y.) Telephone Corp., is in Pasadena, Calif. But that did not prevent him from presiding at the annual meeting of the company, on the afternoon of February 26. After the directors, assembled in the conference room in the Triangle building in Rochester, had enjoyed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luncheon together, President John P. Boylan threw a tiny switch. When the telephone operator was heard to respond with "Number, please?" Mr. Boylan asked for "Long Distance," using a highly-sensitive, all-directional microphone—located in the center of the table—instead of the usual telephone instrument.

When the long distance operator had connected him with the number called—"Pasadena, Calif., Colorado 8341"—the directors heard Chairman Goodwin's voice from a loudspeaker stationed near the head of the table: "The meeting will come to order."

The business of the meeting was then transacted in customary fashion, as though the presiding officer were in the same room instead of 3,000 miles away. An appropriation of $200,000 was made for new equipment and plant additions. This included the provision of $65,000 for a modern switchboard for the new branch office in Canandaigua and $27,000 for additions to the central office equipment in the Main exchange in Rochester.

The present staff of officers was re-elected by the directors. It includes:

Chairman of the board, Fred C. Goodwin; president, John P. Boylan; vice-president and treasurer, Charles M. Beattie; additional vice-presidents, Robert M. Bruce, Frank T. Byrne and John W. Morrison; and secretary, Fred C. Goodwin, Jr.

▼ ▼

## Protect Bank With Telephone in Vault

By B. A. Parsons

Bank robberies, of late years, have become all too frequent and a menace to humanity. Personal injuries and oftentimes loss of life, as well as financial loss, represent the results of this crime. A special telephone set installed in the bank vault will do much to alleviate the hazards following a bank robbery. It may sometimes save a human life and will certainly do much to hasten the capture of the bandits.

For obvious reasons the following suggestions should be given consideration when installing the special telephone instrument:

(1.) An individual line must be provided.

(2.) Conceal both drop and interior wire.

(3.) Install drop wire in underground conduit if feasible, which will prevent its being molested.

(4.) Provide a telephone set of compact design.

(5.) Conceal instrument under or behind some obsolete record books or in an old filing case.

(6.) Make periodic tests to insure operation in event of emergency.

It is realized that the provision of a telephone in the bank vault will have little effect on the prevention of the crime, but it provides a considerable measure of mental relief for the bank employes.

While this plan has merit in both large cities and smaller towns, there seems to be a more urgent demand in the smaller towns. Furthermore, it offers an opportunity for the telephone man to sell additional service and may become a community appreciation.

HARRY WALKER, Eight-Year Old Son of Frank Walker, Installer for The Ohio Bell Telephone Co., Columbus. Photograph Was Submitted by C. A. Swoyer, of Columbus, in a Recent Photograph Contest Conducted by One of the Columbus Newspapers and Was Given Honorable Mention.

▼ ▼

## Telephones of New England Bell

Massachusetts led other New England states in the addition of telephones during 1936, according to figures released recently by the New England Telephone & Telegraph Co. The Bay State increase was 31,970. The total increase reported by the company is 44,281, as compared with 14,971 for 1935.

The state of Rhode Island was second with an increase of 4,536. The increase in New Hampshire was 2,291, Maine, 3,964, and Vermont, 1,520. The company also reports that of 536,307 handsets in service at the end of 1936, over 40 per cent, or 216,800, were being used without charge. This is in accordance with the company's practice of terminating charges, now 15 cents a month for these instruments, to customers who have paid the established charge for 36 months.

In Massachusetts, such charges have been terminated on 156,200 instruments, 21,600 in Rhode Island, 12,900 in New Hampshire, 19,100 in Maine, and 7,000 in Vermont.

# Activities of Commissions and Courts

## Valparaiso, Ind., Case Held Up Pending Sale

The hearing scheduled by telephone division of the FCC for March 8 in Chicago in the purchase by the Crown Point Telephone Co., Crown Point, Ind., of the Northwestern Indiana Telephone Co., Valparaiso, Ind., has been indefinitely postponed.

This action was taken by the FCC on February 24 following a petition filed by the Illinois Bell Telephone Co. which owns the Crown Point company. In the petition it was stated that negotiations are under way for the sale of the Northwestern Indiana company to another purchaser, and if they are consummated, there would be no further proceedings in the case.

▼ ▼

## FCC Expert Estimates A.T.&T. 1937 Earnings

Following the hearing on February 23 before the FCC in its investigation of the Bell, Chairman Paul A. Walker, of the telephone division of the FCC, announced an indefinite recess in the hearings, subject to call of the chairman. It was indicated that the main part of the investigation has been completed and that only some reports on studies of lesser importance remain to be presented.

The long lines department of the American Telephone & Telegraph Co. should earn a net revenue of $25,186,000 in 1937 as compared with $32,419,000 in 1936, Magnus Andersen, an accountant for the commission, testified at the hearing on February 23. In making his provisional estimate, Mr. Andersen said that he had taken into consideration a cut of $12,000,000 for the year in long-distance rates. This reduction went into effect on January 15. It was estimated the 1937 volume of traffic handled would show a 30 per cent increase over last year due to the rate cut. On this basis, company's per share profit from this source in 1937 would be reduced by 39 cents.

He put the earnings last year at $32,419,000 and said a cut in the rates of from $8,000,000 to $10,000,000 would reduce net earnings only about $5,500,000. The net earnings forecast of $25,186,000 for this year equal a 5.79 per cent return on average gross plant investment against actual 1936 return of 7.5 per cent, and a 7.68 per cent return on net investment against 9.76.

Mr. Andersen's figures indicated a net plant valuation of about $258,000,000 on which a 6 per cent return would yield nearly $15,500,000 annually or about $9,600,000 under estimated 1937 return. There was no indication the commission felt such a reduction should be made at this time and Mr. Andersen did not dwell on the figures.

Mr. Andersen submitted a comprehensive volume presenting a statistical analysis of the A. T. & T.'s long lines department depreciation reserve. No comments were directed to a critical review of the depreciation rates employed, the manner in which they were determined or to the adequacy of the reserve, both as to total amount and to the respective classes of plant. The volume, he said, will serve as background material in the determination of adequate depreciation rates for the future.

The report states that the long lines department depreciation reserve on December 31, 1935, was equal to 21.92 per cent of the book cost of depreciable plant, the highest ratio in the history of the reserve. The reserve on that date totaled $94,437,777.

During the hearing, Samuel Becker, special counsel whose resignation is effective the latter part of this month, suggested the commission make some revision of its uniform system of accounts for telephone companies to preclude misinterpretation.

He stated that the A. T. & T. tentatively had interpreted instructions regarding original costs as not applying to inter-company transactions where joint ownership is involved. It was Mr. Becker's last appearance before the commission as he concludes his active commission work March 8, at which time his annual leave commences.

James B. Marley, commission accountant, presented a report dealing with purchase and sale of plant between the long lines department and associated Bell companies. He testified that in some of the major inter-company transactions there had been aggregate "profits" of over $9,000,000, which, adjusted to something over $7,000,000 net, had been charged to surplus.

Desire of the commission to observe the effect on the A. T. & T. Co.'s revenues of the recent large reductions is one factor in a belief that no further rate cuts will be sought in the near future.

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The express purpose of a specialized staff, which is being created, is to conduct continuous examination of rate structures and revenues and report to the commission as to advisability of additional changes.

▼ ▼

## FCC Examiner's Report on Poteau, Okla., Case

The recommendation by Chief Examiner Davis G. Arnold, of the Federal Communications Commission, of a denial of the petition of the Oklahoma-Arkansas Telephone Co., Poteau, Okla., for physical connection with the Southwestern Bell Telephone Co. at Fort Smith, Ark., was made public February 20. With respect to all other relief prayed for in the petition, the chief examiner recommended its dismissal. The parties to this proceeding are given 15 days in which to file objections or exceptions.

The controversy in this long drawn-out case has extended over a decade and has been before the Oklahoma Corporation Commission, the U. S. District Court of Western Arkansas, the U. S. Circuit Court of Appeals, Eighth District, and the Supreme Court of Oklahoma. Upon the denial of certiorari by the Supreme Court of the United States, the case was taken before the Interstate Commerce Commission and, on January 30, 1936, complaint was filed with the Federal Communications Commission.

The examiner, in his report, following hearings at Fort Smith, Ark., and Poteau, Okla., October 5, 1936, stated that the Communications Act "did not intend to authorize the requirement of a physical connection because of a public need which does not presently exist, but which did exist at some remote time. In this view of the matter, evidence of the effect upon the public of acts occurring and conditions prevailing some years back would not be admissible even if the act had been then in existence."

Continuing, the report said:

"The acts on which the damage claims are founded occurred some years before the enactment of the Communications Commission Act. Sections 206-209 do not exhibit a congressional intention to create a cause of action out of past transactions, or which in any way might serve to rebut the familiar presumption of statutory construction that statutes operate prospectively, not retroactively; are addressed to the future rather than to the past. . . .

The limitations provision (section 415) makes no allowance for the prosecution of claims arising before the passage of the act. . . . Instead, the act says that the actions must be brought within one year after the cause of action accrues. In this case any purported cause of action accrued in 1928.

The damage claim is founded on the failure to maintain a physical connection. Under the common law there is no obligation to establish physical connections. Oklahoma-Arkansas Telephone Co. vs. Southwestern Bell Telephone Co.; 33 Federal (2nd) 770, 45 Federal (2nd) 995; Clay County Cooperative Telephone Co. vs. Telephone Company, 107 Kans. 169, 190, Pacific 747, and cases there cited."

As to the petitioner's claim for damages, the examiner held that the respondent failure to maintain a physical connection would not amount to a violation of the act until the commission had ordered the connection. It also held that "money actions are not here maintainable and hence evidence thereof was not admissible, because they do not constitute violations of the act even though they may be justiciable in another forum."

As to the respondent's claim of damages, the commission said, "it amounts to a claim for breach of contract and breach of implied contract, or quantum meruit, over which the commission has no authority whatever."

The examiner found, further, that "the petitioner does not represent that the physical connection which it re-

(*Continued on page* 41)


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(*Continued from page* 38)

quests at Fort Smith, is for other than to handle the calls destined to Fort Smith and points beyond which are received on its system at Heavener, Howe, Wister or Poteau. These calls are now being handled by the respondent from Poteau to Fort Smith and points beyond. . . . The petitioner did not offer any evidence from subscribers or users as to any inadequacy of the present service."

▼ ▼

## Oklahoma City Case Appealed to Supreme Court

Complaining that the Oklahoma Corporation Commission unfairly ordered a cut in telephone rates in Oklahoma City, the Southwestern Bell Telephone Co. appealed to the Oklahoma Supreme Court February 11 to set aside the order.

The commission November 3, 1936, instructed the company to cut the rates of residential telephones in Oklahoma City 25 cents a month and the business rates 50 cents a month. The company immediately announced its intention to appeal and put up a bond which delayed effectiveness of the reduction pending outcome of the appeal.

In its appeal the company gives 20 reasons why it believes the order should be set aside.

Its principal complaint is that the commission considered only the Oklahoma City exchange in its study of company returns without inquiring into the condition of the more than 100 other exchanges operated by the company which the appeal says are not earning a fair return on the investment.

Most of the principles involved in this appeal will be ruled upon by the supreme court when it passes on the appeal of the same company from a commission ruling cutting Tulsa's telephone rates.

The Tulsa and Oklahoma City reduction orders were the result of a statewide survey begun several years ago by the Oklahoma Corporation Commission. As a further step in its investigation, the commission has set March 9 for a public hearing on the rates charged in Bartlesville by the Southwestern Bell. Commission engineers have spent the past several months appraising the company's properties in Bartlesville, and the engineers have also been instructed to make a similar appraisal of the Bell properties in Wewoka.

▼ ▼

## Handset Charge to Be Eliminated After 1937

The additional charge of 15 cents a month to customers for handset telephones will be eliminated by the New Jersey Bell Telephone Co. by 1938 under completed negotiations announced February 11 by the New Jersey Board of Public Utility Commissioners.

Under the terms of the agreement approximately 120,000 customers who have had the handset telephones for a year or more will not be charged the 15 cents a month extra after March 1, and the charge to other customers will be eliminated up to January 1, 1938, at the completion of a year's usage of the handset telephones. After that date there will be no extra charge for handsets. The company stated that elimination of the charge would cut its revenue about $400,000 a year.

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## Handset Cut Held Up in Rhode Island

Following the New England Telephone & Telegraph Co.'s offer to reduce the surcharge period on handsets in Massachusetts and other states served by the system, Rhode Island alone stands out as opposing the company's plan to limit the duration of such charges to the first 18 months after installation. It has been learned that Governor Robert E. Quinn believes that no surcharge whatever should be imposed, although the company has cut this from 25 cents a month a year ago to 15 cents.

In his message to the legislature in January, the governor declared the handset service charge to be exorbitant and

## Answers to Traffic Questions on Page 16

1. If the charge is not accepted and the calling party does not agree to pay for the call on the first use of the toll circuit and the calling party asks you to try the call later or to hold the ticket until a request is received to try the call, if the call is to be tried again as a station-to-station call, it will be considered as a new call and a second ticket is made.
2. Enter the report on the ticket, followed by the name of the called place in parenthesis.
3. "Thank you" is used in dealing with customers and ordinarily "Right" is used in dealing with other operators.
4. It *is* correct to pass the number as "9", using rising inflection and questioning tone.
5. Say, "What telephone do you wish in Chicago, please?"

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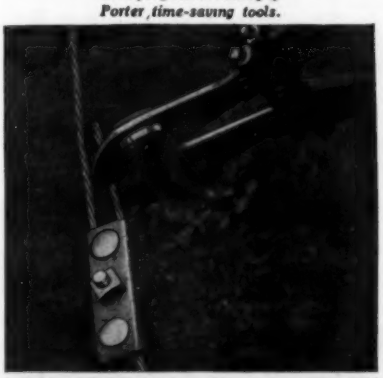

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## "Telephony's" Engineering Data

By B. C. BURDEN



The term magneto exchange refers to those plants in which the subscribers signal the operators by turning a hand-driven alternating-current generator which operates what is known as a drop on the telephone switchboard, thus signaling the operator.

In the common battery exchange, signaling is accomplished by the subscriber merely removing the receiver from the

Fig. 1. Modern Compact Types of Magneto Handset Wall Telephones on Left. Upper Right, Compact Type Magneto Wall Telephone With Separate Receiver and Transmitter. Lower Right, Common Battery Wall Telephone.

## "Telephony's" Engineering Data

By B. C. BURDEN



hook upon which it hangs. This action automatically provides a current path so that battery current, supplied from the central office, flows out over the line. In so doing it operates a signal lamp on the switchboard which notifies the operator of the subscriber's call.

The current furnished by the central office battery serves the dual purpose of talking and signaling, whereas in the magneto exchange, two dry cells are required in each telephone for talking current. Fig. 1 shows typical magneto and common battery telephones and late designs of handset magneto wall telephones. The handset telephone has become quite popular in common battery exchanges and is gradually being introduced in the magneto exchanges.

Exchanges of the common battery type generally furnish some magneto service. This is provided for rural lines where subscribers must operate a hand-driven generator to signal the operator and whose telephones must be furnished with dry cells to supply talking current. Such exchanges are referred to as common battery, even though they necessarily offer both types of service.

### *Two Classes of Service*

Telephone service falls into two classes: local service and long distance service. The term local service refers to calls within an exchange area; that is, within a given city or from city to the surrounding rural district. Long distance service refers to calls originating in one locality and passing over what are known as long distance circuits to another locality not in the same exchange area and requiring connection to a second switchboard.

This distinction between the two types of service rendered results in telephone apparatus and outside plant being classified according to the kind of service provided over it; that is, as either local or exchange plant, and toll or long distance plant.

### *Terms Commonly Used in Telephone Work*

Other commonly used terms pertaining to telephone exchanges are as follows:

CENTRAL OFFICE: This term refers to the office or building in which the switchboard and central office equipment are located. In smaller exchanges, the operators are often referred to as "Central."

SWITCHBOARD: The assembly of apparatus, consisting of signal drops or lamps, keys for ringing and listening, etc.,

## "Telephony's" Engineering Data

By B. C. BURDEN



in a suitable frame or cabinet is known as the switchboard. Switchboards may consist of one or more positions, each position requiring an operator.

MANUAL SWITCHBOARD: Switchboards, which require the service of an operator for connecting one subscriber's line to another, are referred to as the "manual" type.

AUTOMATIC SWITCHBOARDS: Switchboards in which connection from one subscriber's line to another is accomplished by means of electro-mechanical switches, operated by means of a dial on the subscriber's telephone, are known as "automatic" switchboards.

OPEN WIRE: The designation, open wire, refers to the metallic conductors which are attached to brackets or crossarms and used for rural, and toll distribution.

DROP WIRE: The insulated conductors which extend from the distribution plant to the subscriber's residence are known as drop wires. Frequently they are called "drops."

CABLE PLANT: In exchanges of any size, many conductors are required to serve the subscribers. These are furnished in the form of cables, consisting of paper-insulated, copper conductors in a watertight lead sheath. Cable plant is classified by telephone men as aerial, referring to the type carried on poles, and underground referring to the type carried in conduits. A still further classification of cable is "buried" cable. This is cable buried in the soil, either directly or with some protection for the sheath but with no facilities for removing as in the case of underground cable which is placed in a conduit.

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asked Attorney-General John P. Hartigan if the division of public utilities could order the company under the law to cut charge. The attorney-general held that no such order could be issued without an investigation, and this was ordered by the governor on January 14.

According to state house reports no report has as yet been received by Governor Quinn on this matter. About 54,000 subscribers using handsets are now located in Rhode Island, 29,000 of whom pay no surcharge because they have had such sets three years or over. If the surcharge period were cut to 18 months, some 15,000 subscribers would benefit.

▼ ▼

## Reorganization of Indiana Central Company

Over 60 per cent of Indiana Central Telephone Co.'s outstanding first lien bonds have assented to the company's reorganization plan submitted bondholders last December. Expectations, therefore, are that the court will soon be asked to set a date for hearing of confirmation of the proposal.

Before the plan can become operative two-thirds of the total of bonds outstanding must assent.

▼ ▼

## Mayor Asks Removal of Handset Charge

Mayor La Guardia, of New York City, in a letter sent February 27 to J. L. Kilpatrick, president of the New York Telephone Co., asked that the practice of making an additional charge for handset telephones be discontinued after January 1, 1938.

Subscribers of the New Jersey Bell Telephone Co., Mayor La Guardia noted, will not have to pay extra for handset service after that date, while those who have paid for such service for one year no longer have to do so commencing March 1.

▼ ▼

## Rate Revisions Asked by Nebraska Company

Testimony was presented at a hearing February 8 on an application for the readjustment of rates at its various exchanges in the central western portion of the state filed with the Nebraska Railway Commission by the Central Nebraska Telephone Co., which is operated from Grant, Neb., but has its general offices in Denver, Colo. The application asks for rate revisions at all exchanges except Venango.

The company testified its gross revenues in 1934 were $21,750 and claimed it has been operating at a loss over a period of years.

The company says that these will not be equivalent to a restoration of rate schedules as they existed prior to the installation of emergency rates several years ago, and will still fail to give a reasonable return. The company states that it is now confronted with a situation where labor, materials and taxes have increased and are threatening to go higher. It says that the application is made partly on the suggestion of the commission that it balance its schedules at its various exchanges, the unbalanced condition resulting from the fact that the purchases as units of the exchanges had been made at various times and that operation had been continued on the basis of the schedules then in effect.

The company reports that, following a suggestion of the commission, it had reduced rates, particularly to farmers in distressed areas, on the theory that this would enable them to secure the return to service of a number who had been forced to quit because of economic conditions. The theory did not work out in practice, says the company in submitting a set of figures to show that so far as net earnings are concerned, the experiment was a failure.

Increases in monthly rates were asked as follows: Brady and Maxwell, 25 cents on individual business and all farm service and 50 cents on all residential service; Grant, 35 cents on business and 15 cents on switching; Imperial, 25 cents on farm service; Palisade, 25 cents on individual business and farm service and 5 cents on switching; Sutherland, farm, party line, 25 cents; Wellfleet, 50 cents on business and 25 cents on farm and residence service.

At Keystone individual business is increased 35 cents a month in the proposed schedules and residence individual decreased 15 cents, residence party decreased 40 cents and farm party cut 15 cents.

▼ ▼

## Recommendations on Ohio Commission

Citing the long drawn-out Ohio Bell rate case as an example of the impotency of the Ohio Public Utilities Commission, Howell Wright reported to Col. C. O. Sherill's Ohio Government Survey Commission that the utilities commission is hampered by political control and insufficient funds.

Among the remedies suggested were addition of engineers, accountants and lawyers to the commission's staff; increase of salary to $6,000 a year and provision for the commission to operate as administrative body making its own rules; provision of additional funds for the commission (by increasing assessments on utilities, if necessary, and by halting divergence of funds to other uses); and by putting all com-


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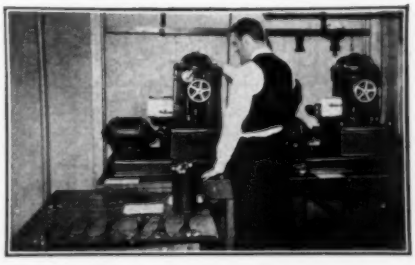

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**T. M. Partridge Lumber Co., Minneapolis, Minn.**—Northern White—Western Red Cedar Poles. Plain or butt treated.

**H. Sigalet & Company, Ltd., Lumby, B. C., Canada**—Western Red Cedar Poles. Plain or Butt treated.

**Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.**—Finished Cedar Poles. Plain or Butt treated.

mission members under civil service. Mr. Wright, a Cleveland attorney and engineer, was assisted in making the report by prominent professors and utility experts.

▼ ▼

## New Public Counselor of Indiana Commission

Ralph Hanna, Delphi, an assistant attorney general, has been named public counselor of the Indiana Public Service Commission by Clifford Townsend, succeeding Francis K. Bowser, Warsaw.

Dissatisfaction with delay in settling some rate cases reported prompted the governor to ask Mr. Bowser for his resignation. Mr. Bowser was appointed public counselor by Former Governor Paul V. McNutt.

▼ ▼

## Wisconsin Commissioner Confirmed by Senate

The Wisconsin Public Service Commission is again an operating commission. Robert A. Nixon, the second selection of Governor La Follette for one of the vacancies on the commission (TELEPHONY of February 27) was unanimously confirmed by the Wisconsin senate on February 23. He took office March 1.

There is still one vacancy in the membership of the commission to be filled by Governor La Follette.

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## Service Complaint Filed Against Ohio Companies

The Ohio Bell Telephone Co. and the Ohio Associated Telephone Co. were named as defendants in a complaint filed February 18 with the Ohio Public Utilities Commission by Joseph S. Riegel, Howard F. DeVilbise, Joseph W. Robinson, Geoffrey R. Bennett, Robert A. Stranahan, and Zale A. Reuben, who reside outside of Toledo in Lucas county along the west side of Corey Road in the Ottawa Hills district.

These complainants charged they had been refused telephone service at their respective residences by the Ohio Bell Telephone Co. which defends such refusal on a contract or agreement which apportions the complainants' territory to the Sylvania exchange of the Ohio Associated Telephone Co.

The complainants deny that such agreement is binding or has been approved by the commission and allege that efficient service can only be supplied by the Ohio Bell, and deny that such service can be rendered by the Associated company.

The complaint further alleges that other sectors of the Toledo metropolitan are served by the Bell company and that its refusal to operate in this territory is an unreasonable and unlawful discrimination against the residents of Ottawa Hills.

## Commission Rulings and Hearings

***Federal Communications Commission, Washington, D. C.***

February 24: Telephone Division granted indefinite postponement of hearing on joint application of Northwestern Indiana Telephone Co., Valparaiso, Ind., and Crown Point (Ind.) Telephone Co. for approval of purchase of former by the latter. The case had been set for hearing in Chicago March 8.

***Illinois Commerce Commission***

March 1: Hearing in Chicago on citation of the commission, on its own motion, against the Ilinois Bell Telephone Co. to show cause why there should not be a reduction in rates for intrastate telephone service rendered by the company in the state of Illinois.

Entry of appearance of city of Chicago, villages of Maywood, Olympia Fields, and Richton Park. Protest filed by city of Cairo.

March 1: Hearing in Chicago on proposed change in rates for telephone service stated in I. C. C. No. 1, section 1, original sheet No. 5, general local exchange tariff, telephone service I. C. C. No. 2 original sheet No. 1A, schedule of toll rates I. C. C. No. 2 original sheet No. 1A, rates for special contract service and I. C. C. No. 2 section 1 original sheet No. 6 teletypewriter exchange service tariff of the Illinois Bell Telephone Co. protest filed by city of Cairo.

March 3: Hearing in Springfield on application of the Illinois Bell Telephone Co. for authority to purchase from the American Telephone & Telegraph Co. certain telephone property in Tazewell County.

March 3: Hearing in Springfield in the matter of a proposed new schedule of rates to be charged by the Southwestern Bell Telephone Co. for exchange telephone service at Freeburg.

***Missouri Public Service Commission***

February 23: Approval granted joint application of A. D. Johnston to sell and R. B. Kelley to purchase the Diamond Telephone Exchange located at Diamond.

***Ohio Public Utilities Commission***

February 26: Order issued dismissing for want of prosecution the applications of the Buckeye Lake Home Telephone Co., the Citizens Telephone Co. of Circleville, the Clinton Telephone Co., the Convoy Telephone Co., the Greenfield Telephone Co., the Marion Telephone Co., the New Bremen Telephone Co., the New Concord Telephone Co., the Portsmouth Home Telephone Co. and the St. Mary's Telephone Co. to retire through depreciation reserve the 1933, 1934 and 1935 retirements of discontinued station installations and drop wires which were charged to maintenance.

***Oklahoma Corporation Commission***

March 9: Hearing in the commission's investigation of rates charged Bartlesville subscribers by the Southwestern Bell Telephone Co.

The commission also formally instructed its agents February 13 to make an appraisal and study of the financial affairs of the same company in Wewoka.

Both orders are part of a state-wide survey of telephone rates begun several years ago. Orders for rate reductions in Tulsa and Oklahoma City have been appealed to the state supreme court by the company.

# Condensed Telephone News

## Financial

NEW YORK, N. Y.—On February 26 the board of directors of General Telephone Corp. declared a dividend of 25 cents per share on the common stock, payable March 22 to holders of record at the close of business on March 9, and a regular quarterly dividend of 75 cents per share on the $3 convertible preferred stock, payable April 1 to holders of record at the close of business on March 15, 1937.

## Telephones

DENVER, COLO.—The Mountain States Telephone & Telegraph Co. added 3,351 new subscribers in January; 546 in Denver, 873 in the state of Colorado, 490 in Arizona, 372 in New Mexico and El Paso, Texas, 252 in Idaho, 600 in Montana, 534 in Utah and 230 in Wyoming.

DES MOINES, IOWA—During 1936, the Northwestern Bell company gained 10,888 telephones in its 157 Iowa exchanges. Of this total, 851 rural telephones were added. The increase in the number of telephones during the past year exceeded the 1935 gain by 3,400 telephones. To gain the 10,888 telephones, 46,162 telephones were connected and 35,274 were disconnected from service. At the end of last year the Northwestern Bell was serving 249,135 telephones in Iowa.

The company's highest development in the state was reached in May, 1931, when the number of telephones totaled 273,218. Between that time and August, 1933, the number decreased to 222,840. Since that time, however, there has been steady increase in the number of telephones in service.

MINNEAPOLIS, MINN.—Telephone installations in Minneapolis and St. Paul have passed the previous all-time peak established early in 1930, according to officials of the Northwestern Bell Telephone Co. and Tri-State Telephone & Telegroph Co.

There was a marked gain in installations in both cities during January, there being a 1,359 gain in new telephones installed here, compared with 789 in January last year. The gain in 1936 was 12,500, bringing the total as of February 1 to 135,600, compared with the previous high of 134,000 in 1930.

Telephone officials estimate there has been a 27,000 gain in Minneapolis' population since 1930, but improving conditions are credited for much of the step-up.

In St. Paul, the January installation gain was 609, compared with 285 a year ago. The total number of telephones in service February 1 was 78,881, compared with 72,811 in 1930.

NEW YORK, N. Y.—General Telephone Corp. reports for its subsidiaries a gain of 1,810 company-owned telephones for the month of January, as compared with a gain of 1,029 telephones for the month of January, 1936. The subsidiaries now have in operation a total of 336,526 company-owned telephones.

NEW YORK, N. Y.—The New York Telephone Co. reports a station gain in January of 12,699, against an increase of 6,440 stations in January, 1936, and a loss of 487 stations in January, 1935.

PHILADELPHIA, PA.—The Bell Telephone Co. of Pennsylvania reports a net gain of 8,948 telephones in service in January, the largest gain for any January in its history. The increase exceeds by more than 1,200 units the previous record of 7,729 units in January, 1929. The net gain in January, 1936, was 3,849 telephones, and in January, 1935, 2,062.

MILWAUKEE, WIS.—There was a net gain in January of 1,593 telephones in service at the 95 exchanges operated by the Wisconsin Telephone Co., it has been announced by John O'Day, vice-president. Milwaukee's share of the January increase was 666 telephones.

## Elections

TROY, ALA.—The stockholders of the Standard Telephone & Telegraph Co. recently elected Lane Enzor to fill the office of president and treasurer made vacant by the death of former Governor Charles Henderson. F. W. Kuhn was elected secretary and L. D. Rose, assistant secretary. Mr. Enzor, Mr. Kuhn and W. C. Cameron were elected members of the board of directors.

BRIGHTON, IOWA. — Officers of the Brighton Telephone Co. have been elected as follows: President, Otto Fritz; vice-president, H. C. Kyle; secretary-treasurer, L. E. White; directors, F. A. Hoskins, M. L. McCreedy, C. D. Weldin, I. F. Kraemer and Anson Brinton.


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# Obituaries

**EDWIN F. HILL**, of Washington, D. C., publicity director of the Chesapeake & Potomac Telephone Co. and in charge of the 24-hour press information service for the American Telephone & Telegraph Co. since it was established in January, 1935, died February 20 at the age of 55. His death was caused by a rare and incurable blood disease called leukemia.

Mr. Hill had a service record with the Bell System of 37 years, starting in telephone work as a lineman in Virginia in 1900. Working his way up through the cable-splicing department he became in turn foreman, general foreman, district plant superintendent and division superintendent.

He was placed in charge of the information department of the Chesapeake & Potomac Co. of West Virginia and later became regional information director for the Chesapeake & Potomac properties in Virginia, West Virginia and District of Columbia.

Mr. Hill was prominent in civic life in Washington as well as in the Kiwanis Club. He served as international trustee of Kiwanis for several years. He was a director of the International Society for Crippled Children, promoting welfare work for crippled children, and helped the campaign before Congress to establish two such schools in Washington.

Mr. Hill was awarded a Theodore N. Vail medal for noteworthy telephone service when working in West Virginia. When an army bombing plane crashed, causing the deaths of five aviators, Mr. Hill worked 24 hours collecting information by telephone.

**WARREN FOWLER**, of West Lebanon, N. Y., who retired in 1927 as president of the Rensselaer-Columbia Telephone & Telegraph Co., died at his winter home at St. Petersburg, Fla., February 19. He was 88 years old and was born in Manchester, Vt.

Mr. Fowler spent practically his entire business life organizing and developing the telephone company which serves 2,000 subscribers in the southeastern section of Rensselaer County and the northern section of Columbia County, New York. It was started in 1894.

A graduate of Oberlin College, he went to West Lebanon in the employ of the Western Union Telegraph Co.. It was his idea of speeding delivery of telegrams which led him to organize the telephone company. Financial backing was given by Abner Haight and George H. Pelden, New Lebanon merchants. The company prospered and grew. Mr. Fowler was general manager until 1920 when he became president.

Three daughters survive Mr. Fowler.